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TRANSACTIONS

OF THE

Royal Academy of Medicine

IN IRELAND.

VOL. VI.

EDITED BY

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RULES.

1. The name shall be, "ROYAL ACADEMY OF MEDICINE IN IRELAND." (1887.)

Constitution.

2. The Academy shall consist of Fellows, Honorary Fellows, Members, and Student Associates.

Management.

3. The affairs shall be managed by a Council, consisting of the President, the six Presidents of Sections, the General Secretary and Treasurer, the Secretary for Foreign Correspondence, six Secretaries of Sections, and eight Councillors, being two representatives from the Medical, Surgical, Obstetrical, and Pathological Sectional Councils respectively.

Meetings.

4. The Meetings shall be General and Ordinary.

Publication of "Transactions."

5. The "Transactions" shall be published by the Council, subject to the provisions hereinafter contained.

Original Fellows and Members.

6. All the Members of the present Societies (Medical, Surgical, Obstetrical, and Pathological) shall be Original Fellows or Members, without entrance fee, on payment of the annual subscription on or before 31st December, 1882.[a]

Fellows.

7. Fellows of the King and Queen's College of Physicians in Ireland, and of the Royal College of Surgeons in Ireland, shall be admitted, without ballot, on payment of the entrance fee and the subscription for the current year. All others, being Registered Medical Practitioners not directly or indirectly engaged in the sale of drugs, shall be proposed by two Fellows, and elected by ballot by the Council.

8. Candidates shall be proposed at one Meeting of the Council, and balloted for at the next—one black bean in four to reject.

Privileges of Fellows.

9. Fellows only shall be eligible for office in the Academy. They shall have the privilege of attending all Meetings of the Academy, of making Communications, and of voting and speaking at such meetings. They shall also receive a copy of the "Transactions."

[a] Those who have paid a Life Subscription to any of the above Societies will be admitted to the privilege of Fellows on payment of Member's subscription.

10. These privileges shall not be exercised by any Fellow in arrear with his subscription.

Honorary Fellows.

11. Honorary Fellows, limited in number to 25, may be nominated by the Council, and elected, on motion at a General Meeting of the Academy by a majority of at least two-thirds of those present and voting.

Members.

12. Any Registered Medical Practitioner may be elected as a Member, the election to be conducted in the same manner as that of Fellows.

Privileges of Members.

13. Members shall have the privilege of attending the Ordinary Meetings of the Academy, of making Communications, and of taking part in debate. They can purchase the "Transactions" at cost price.

Student Associates.

14. Registered Medical Students, of the third or subsequent years, may be elected as Student Associates in the same manner as the Members.

15. Student Associates shall have the privilege of attending the Ordinary Meetings of the Academy.

Annual Subscription.

16. Fellows shall pay £2 2s., and Members £1 1s. Student Associates shall pay 5s. The Subscription shall become due on the 1st of October in each year, and if the Subscription be not paid on or before the first Meeting in February, the defaulter shall cease to belong to the Academy, unless the delay shall be accounted for to the satisfaction of the Council. No Fellow shall vote at the Annual General Meeting who has not paid his subscription for the year. Medical Officers of the Army and Navy, and Registered Medical Practitioners not residing within 15 miles of Dublin, are eligible as Fellows of the Academy on payment of the entrance fee, and an annual Subscription of £1 1s.

Entrance Fee.

17. After admission of Original Fellows, all Fellows shall pay an entrance fee of £1 1s.

Council.

18. The Council shall meet on the first Wednesday in the month throughout the Session, or oftener should they see occasion—five to form a quorum.

19. Notice of all Extraordinary Meetings shall be transmitted by the Secretary to every Member of the Council. The President or any five Members of Council may call an Extraordinary Meeting of the Council. The Council shall determine questions by vote, or by division if so demanded, the President having a casting vote only. Any regulation of the Council shall have the force of a law, until submitted to the next General Meeting. The Council shall have the power of filling up any vacancies which may occur in the list of Officers of the Academy, except that of President, before the Annual General Meeting. If a vacancy in the office of President should occur, the General Council shall summon a Special General Meeting of the Academy to fill such vacancy. (1888.)

Sectional Councils.

20. There shall be six Sectional Councils elected by the Annual General Meeting in October, termed respectively—the Medical, the Surgical, the Obstetrical, and the Pathological, the State Medicine, and the Anatomical and Physiological Councils.

21. No Fellow shall be eligible as a candidate for election on more than two Sectional Councils, but no Fellow shall be eligible as a candidate for election on both the Medical and Surgical Sectional Councils. (1888.)

22. Each Sectional Council shall consist of the President of the Section and ten Members, one of whom shall act as Secretary to the Section; except the State Medicine and Anatomical and Physiological Councils, which shall each consist of a President and six Members. (1888).

Meetings of Sectional Councils.

23. Each Sectional Council shall meet on a fixed day at least one week before the Ordinary Meeting of their Section, three to form a quorum.

Powers.

24. Each Sectional Council shall have the power of making any such arrangements as it thinks necessary to carry on the work of the Ordinary Meetings which are under its charge, provided that such arrangements do not interfere with the general laws of the Academy; and any Rules laid down by such Council shall have the force of laws at the Ordinary Meetings under its charge, until submitted to the General Council.

25. Each Sectional Council shall have the power of filling up any vacancies that may occur among its Members until the Annual General Meeting.

Committee of Reference.

26. The Council shall appoint a Committee of Reference, to report upon morbid growths and other specimens exhibited before the Academy; of this Committee the Exhibitor shall, for the occasion, be a Member.

Officers.

27. A President, to be elected by the Annual General Meeting in October, and to hold office for three years.

28. The Presidents of the Colleges of Physicians and Surgeons for the time being shall be the Presidents of the Medical and Surgical Sections. The Presidents of the other Sections shall be elected by the Fellows at the Annual General Meeting, and shall hold office for two years. (1888.)

29. One General Secretary and Treasurer to be elected at the Annual General Meeting.

30. It is expedient that a fixed salary (of one hundred guineas) shall be paid yearly to the General Secretary in consideration of the fact that the editing of the "Transactions" is part of his duties.

31. One Honorary Secretary for Foreign Correspondence to be elected at the Annual General Meeting. (1888.)

32. The Councillors for each Section to be elected at the Annual General Meeting. Each Sectional Council shall elect two Members to act on the General Council, except in the case of the Sections of State Medicine and Anatomy and Physiology. (1888.)

33. Two Members in each Sectional Council shall retire annually, and be ineligible for re-election for one year.

34. Six Secretaries, one for each Section, to be appointed by the Sectional Councils.

35. At all elections after the year 1882, any Fellow desirous of nominating a candidate for election on any of the Sectional Councils shall, at least one fortnight before the Annual General Meeting, forward an application to the General Secretary to enter the name of such Fellow on the list of candidates for the office of Councillor of that Section, provided that the Fellow so nominated shall have consented to act. (1886.)

36. That all elections shall be by ballot.

Duties of Officers.

37. *The President* shall preside at the Annual and Special General Meetings and at General Council Meetings. In the absence of the President, the Chairman shall be appointed by the meeting. (1888.)

38. *The Presidents of Sections* shall preside at the Ordinary Meetings of the Academy, and shall also preside at the Sectional Council Meetings. In the absence of the President, the Chairman shall be appointed by the Meeting. (1888).

39. *The General Secretary* shall attend all General Meetings of the Academy and General Council. He shall take minutes of such meetings, to be read at the following meeting.

40. He shall receive and have charge of all papers intended for publication in the "Transactions" of the Academy, after they have been handed over to him by the Secretaries of the several Sections.

41. He shall, on receiving notice from the Secretary of a Section, send out to all the Members notices of the title or titles of the paper or papers for the next Ordinary Meeting, with the name or names of the authors, and, so far as possible, of the subjects for Exhibition, with the names of the Exhibitors.

42. He shall arrange for the Exhibition of specimens and the reading of papers, which are forwarded to the Academy by those who are absent, or are not members.

43. The General Secretary and Treasurer shall receive all moneys, and lodge the same in bank to the account of the Academy, and all cheques shall be signed by the Treasurer and one other Councillor.

44. The Accounts shall be audited by two Fellows, not Members of Council, to be appointed by the President at some meeting previous to the Annual Meeting.

Duties of Secretaries of Sections.

45. To attend the Meetings of the Council of the Section and the Ordinary Meetings of the Academy, under the management of said Council, and to take minutes at such meetings, to be read at the next following meeting of that Section.

46. To keep such papers as the Sectional Councils deem worthy of publication, for the purpose of handing them over to the General Secretary.

47. To inform the Secretary of the Committee of Reference of any specimens referred to that Committee, and to transfer the specimens to that Secretary.

48. To give notice to the General Secretary, one week previously to the meeting, of the titles of papers for the evening, the names of the authors, and, so far as possible, the objects for Exhibition, with the names of Exhibitors, so that the General Secretary may inform the Members.

Meetings.

49. The Annual General Meeting to take place on the last Friday in October, for the election of Officers and Members of Council, and for the general business of the Academy.

50. Due notice of the meeting shall be given by the Secretary to all members one fortnight previously, and the names of Candidates proposed for office must be in the hands of the Secretary one week before the meeting.

51. No motion involving a change of these Rules shall be brought before this meeting except one week's notice thereof shall have been given by the Secretary to each Member.

52. The President may—and shall forthwith, on receiving a requisition signed by seven Fellows, at any time—on giving one week's notice, summon a Special General Meeting, for the consideration of particular business, the nature of which must be specified in the letter of summons convening the meeting, and at such meeting no other business can be transacted. In the event of the President being unable, from any cause, or declining, to summon a Special General Meeting of the Academy, it shall be in the power of the General Council to summon such meeting. (1888.)

Ordinary Meetings.

53. The communications to be submitted to the Ordinary Meetings shall be grouped under the following heads :—Medicine, Surgery, Pathology, Obstetrics, State Medicine, and Anatomy and Physiology ; and the conduct of such meetings shall be in the hands of the several Sectional Councils, each Sectional Council to have the management of the Ordinary Meeting in rotation, as arranged by the General Council. (1888.)

54. The Ordinary Meetings shall be held on every Friday evening, from the first Friday in November until the last Friday in May, inclusive, at eight o'clock, except during the Christmas and Easter recesses.

55. All Fellows, Members, and Student Associates attending the meetings, shall write their names in the attendance book.

56. Any Fellow or Member may introduce two Visitors by cards obtained from the Sectional Secretaries.

57. Officers of the Army or Navy Medical Departments shall, on presenting their cards, be admitted to the Ordinary Meetings of the Academy.

58. No communication shal exceed twenty minutes in its delivery, nor any speech thereon ten minutes, except by permission of the Chairman. No one shall speak twice upon the same communication, except the author, who has the right of reply.

Ordinary Meetings.—Order of Business.

59. (1.) Chair to be taken at 8 30 p.m.

(2.) Chairman to read list of specimens, &c., exhibited by card, together with the names of the Exhibitors.

(3.) No Pathological Specimen shall be exhibited at any Section other than the Pathological and Obstetrical, except by card. This Exhibition shall not exclude any subsequent communication regarding it at the Pathological Section.

(4.) There shall be no Exhibition of Specimens by card in the Obstetrical or Pathological Sections.

(5.) Any member shall have liberty to exhibit any recent specimen at any of the meetings of the Obstetrical Section, provided it illustrates any question in gynæcology.

(6.) At the meetings of the Obstetrical Section recent specimens may be exhibited, and the President shall invite discussion thereon, provided that such exhibition of specimens or discussion, if any, thereon, must terminate at 9 o'clock, p.m., but that, if necessary, they may be resumed after the papers for the evening have been read and discussed.

(7.) Chairman to ask if any member has any observations to make or motion to propose relative to any living specimen on the List of Exhibition.

(8.) Chairman to call upon the author of the first paper on the list to read his paper.

(9.) Chairman to call upon members to discuss the paper, or, at his discretion, to take any other paper or papers on the list relating to the subject, and have the discussion subsequently on all such papers collectively.

(10.) When the last paper has been discussed, the Chairman to ask if any member desires to speak upon any of the specimens exhibited by card.

(11.) After the discussion upon any specimen, the Exhibitor has the right of reply.

Regulations regarding the Exhibition of Specimens by Card.

60. (1.) Any member may exhibit by card at any Ordinary Meeting, except at the meeting of the Pathological and Obstetrical Sections. At the meetings of the Pathological all specimens must be presented and described *viva voce*, and debate may be invited thereon.

(2.) Notice shall, if possible, be given to the General Secretary, or the Secretary of the Section, on or before the previous Ordinary Meeting.

(3.) Specimens must be in the room at 7 45 on the night of Exhibition.

(4.) Specimens for Exhibition by card shall be open for inspection at 8 p.m.

(5.) A card, containing all particulars for publication, shall be placed with the Specimen. Cards for this purpose are to be obtained from the Secretary.

(6.) The Exhibitor should be present, and he shall furnish further details if asked for.

(7.) Every Exhibitor shall submit the Specimen or Specimens on view to the Committee of Reference, if the meeting so decide.

Exhibition of Pathological Specimens.

61. No lengthened reference to treatment shall be allowed upon any Specimen, except by the express permission of the Chairman.

By-laws concerning "Transactions."

62. The "Transactions" shall consist of such Communications made to the Academy by or through Fellows or Members as may be deemed by the General Council suitable for publication; also, of discussions of importance or interest arising out of such Communications.

63. All Communications accepted by the Academy become the property of the Academy, but authors may also print their Communications in any publication in addition to the "Transactions." Papers shall be handed to the Secretary of the Section immediately after they have been read.

64. The "Transactions" for the year shall be presented to all Fellows of the Academy who have paid their Annual Subscriptions.

65. The "Transactions" may be purchased by Members at cost price.

66. The Publication Committee of each Section shall meet not later than the Tuesday after each meeting of the Section, for the purpose of abstracting the proceedings—the abstract to be placed in the printer's hands on same evening, and forwarded to the editors of medical journals with the least possible delay. (1888.)

67. Contributors of papers are requested to send their papers to the Academy printer early enough to allow of their being put in type before the meeting, and read in proof. (1888.)

68. That on the evening of the day of meeting of the Sectional Council, when the papers for the next meeting have been decided upon, a circular be sent to each contributor informing him :—

(1.) That he is expected to be ready or else take his place at the bottom of the list.

(2.) That he must have an abstract ready with his paper, otherwise he will be noted in the published proceedings in such form as the Publication Committee think fit.

69. The General Council is empowered to defray the expenses in whole or in part of any illustrations which it may consider advantageous to the elucidation of the papers published by the Academy.

70. An abstract (prepared by the author) of each communication made at the Academy, along with a report of the discussions thereon, shall be furnished to the editors of such medical journals as may desire to publish them, and the authors of such communications shall be empowered to publish their papers *in extenso* in any periodical or periodicals they may think fit, such communications also to appear in the "Transactions," provided the Council consider them worthy of insertion.

Expulsion of Fellow or Member.

71. Expulsion of a Fellow or Member can take place only at a General Meeting of the Academy, on the motion of the Council, if two-thirds of the Members present shall vote for the same by ballot. Of such ballot the Council must give at least fourteen days' notice in writing to every Fellow of the Academy.

New Laws.

72. New Laws, or alterations in existing Laws, can be proposed only at the Annual General Meeting. Any Fellow proposing such alteration shall give notice to the General Secretary at least ten days before the General Meeting in October.

REPORT.

THE General Council have to report that, although from death and other causes the Academy has suffered losses in its numbers during the year, the accessions of new Fellows and Members have maintained the roll at about the same number as formerly.

They had the utmost satisfaction in paying to the Reception Committee in connection with the visit of the British Medical Association, One Hundred Guineas, as ordered by the last Ordinary General Meeting. The Academy has thus been able to take position with the other Medical bodies which contributed, and to give proof of its desire and power to assist in the furtherance of science.

At a Special General Meeting held on 26th April, 1887, a resolution was passed directing that an Address of congratulation should be presented to Her Gracious Majesty on the occasion of her Jubilee. The Council carried out the direction of the Fellows, and the Address having been forwarded, Her Majesty was graciously pleased to receive it.

At the same Meeting, it was ordered that application should be made for permission to use the word "Royal" before the present title of the Academy. A short history of the Academy, its rules, and the "Transactions" were forwarded with the application, and the Council have great pleasure in informing the Fellows that Her Majesty has been pleased to Command that the Academy shall henceforth be known as "The Royal Academy of Medicine in Ireland." The following letter has been received from the Under-Secretary:—

DUBLIN CASTLE,
9th June, 1887.

SIR,—I am directed by the Lord Lieutenant to acquaint you, for the information of the Academy of Medicine in Ireland, that the Petition which you put forward on their behalf, praying for

permission to adopt the title "Royal" in the name of the Academy, was duly transmitted to the Secretary of State for the Home Office for submission to the Queen, with His Excellency's recommendation that the prayer of the Petition should be acceded to; and I have now to inform you that a letter has been received from Mr. Secretary Mathews, stating that he has had the honour to lay the Petition in question before the Queen, and that Her Majesty has been graciously pleased to accede to its request, and to command that the Academy shall be called "The Royal Academy of Medicine in Ireland."

I am, Sir,
Your obedient Servant,
REDVERS BULLER.

W. Thomson, Esq., F.R.C.S.I.,
General Secretary to the Royal Academy of Medicine.

As this will involve a change of Rule I., the Council suggest that it shall be changed accordingly.

The General Treasurer has represented to the Council that it would be more convenient if the duties of his office were undertaken by the General Secretary. At present a considerable correspondence between the two officers is necessary, and much time and expense would be saved if the offices were amalgamated. The Council having discussed this matter with the officers referred to, are of opinion that such a change is advisable, and they suggest that the necessary alteration shall be made in the Rules.

The Council hope that the Academy will continue to increase in numbers. They specially desire to see the list of Student-Associates increased, and they beg to impress on the Fellows the importance of enlisting, as soon as possible, the sympathies of those to whom in the future the Academy must look for support.

ROBERT M'DONNELL, *President.*
W. THOMSON, *General Secretary.*

TREASURER'S REPORT.

RECEIPTS.

	£	s.	d.
To Balance in Bank, 16th October, 1886 -	17	19	7
„ Subscriptions - - - -	447	14	6
„ Dividend on Consols - - -	10	14	11
Total Receipts - -	£476	9	0

EXPENDITURE.

	£	s.	d.
General Secretary's Salary - - -	105	0	0
*Printing, Stationery, Postage, &c. - -	62	8	11
Illustrations in "Transactions" - -	8	8	1
Reporters - - - - - -	46	0	0
Attendants and Refreshments at Meetings -	45	4	4
Sundries - - - - - -	3	6	4
	270	7	8
Illuminating Address to H. M. the Queen -	4	4	0
Donation to Reception Fund Brit. Med. Association Meeting - - - -	105	0	0
	379	11	8
Balance in Bank - - - -	96	17	4
Total - - - -	£476	9	0

We have examined the Treasurer's Statement of the Accounts of the Academy of Medicine for the Session 1886-87, and we find it correct.

C. B. BALL, M.D.
A. H. BENSON. } *Auditors.*

October 14th, 1887.

GEO. F. DUFFEY, *General Treasurer.*

*NOTE—The amount due for Printing the 5th Volume of the "Transactions" could not be included in this statement, as the account for it has not yet been furnished.—G. F. D.

TRANSACTIONS

OF THE

ROYAL ACADEMY OF MEDICINE IN IRELAND.

SECTION OF MEDICINE.

CASE OF LYMPHADENOMA.

By WILLIAM M. A. WRIGHT, B.A., M.D., Univ. Dubl.; L.K.Q.C.P.

[Read in the Section of Medicine, November 18, 1887.]

Lymphadenoma is one of those rare diseases of childhood which only occasionally come under the notice of the practitioner in this country, and as during the past summer I had under my care a case of it which presented some special points of interest, I thought it might be worthy of bringing under the notice of the Medical Section of this Academy.

Case.—On the 26th of April, 1887, I was asked to see Alice F., aged twelve years and four months, of whom I was given the following history:—She was the child of healthy country people, her father being a middle-aged man, her mother a young woman. There was no instance of hereditary disease on her father's side, but there had been one case of consumption in her mother's family.

Her father died when she was about five years old, after a long illness, beginning as a swelled leg, which gradually grew worse, and was very painful; then it was lanced by the medical man in attendance. Shortly afterwards, the dressings getting displaced, hæmorrhage began, which was not noticed for some time, and he died from loss of blood. He had suffered occasionally from gout. The child's

mother is still alive and healthy. After the death of her father, Alice and her sister lived with various friends until January, 1886, when they were admitted into an orphan asylum in the neighbourhood of this city, where the sister still remains strong and healthy.

Up to December of last year Alice was a fine, strong, rosy child, who had safely passed through severe attacks of measles and whooping-cough; but in March of this year a lady who took a great interest in her, hearing that she was not at all well, went to see her and found her looking very ill, suffering from enlarged glands in her neck and a severe cough. In the beginning of April (the 6th), as she was nothing better but rather worse, her friend moved her to her own house in Dalkey, thinking that a change, with good food and nursing, would soon make her well. On bringing her home Alice went early to bed and slept all that evening and night, all the next day and all the following night, only rousing when awakened for food, and at once falling asleep again. On the second day she was up for five hours, but was very glad to get back to bed and immediately fell asleep. At this time the glands of her neck were greatly swelled. After a few days her cough, which had been very troublesome, got quite well, her appetite began to be fairly good, and she enjoyed her food.

April 10th she spent in bed sleeping all day, but on the 11th was again up for five hours.

On the 26th I saw her for the first time. She was lying in bed, and appeared a bright, intelligent child, with dark blue eyes and very long brown lashes. On either cheek was a bright malar flush, but the rest of her face, her lips, gums, and conjunctivæ, were markedly anæmic. When spoken to she answered in a low whisper, and on inquiry I ascertained this was the only way she had used her voice since her illness began. At my request, and by visibly making an effort, she spoke a few words in an ordinary tone. On examination I found all the glands on both sides of her neck very much enlarged and indurated, the glands in the anterior triangle being much larger than those in the posterior and fused into a nodular mass.

In the thorax, the axillary glands on both sides were somewhat enlarged, but none felt bigger than a large hazel nut. Lungs and heart both appeared sound. The inguinal glands of both sides were also slightly enlarged, and were tender to the touch, in which particular they differed from both the cervical and axillary. The abdomen was neither full nor retracted, but a peculiar feeling of dry roughness of the skin was noticeable all over it. No enlarged

mesenteric glands could be made out, nor was there any abdominal tenderness. There was slight increase of splenic dulness, but the edge of the spleen could not be felt below the ribs. There was no increase in the size of the liver. The tongue was clean, but very red, with enlarged papillæ visible all over it. The pulse was 110 and the temperature 103° F. There had been diarrhœa for four weeks before my visit, and the drowsiness referred to before still continued, but was not nearly so remarkable as at first. I regret to say that a microscopic examination of her blood was never made.

April 28th.—I again saw her. She was worse, suffering more severely from diarrhœa. Pulse 120, temperature 102·5°.

May 1st.—Diarrhœa better, but temperature still high—103°—and pulse 120.

May 4th.—Alice much better; voice stronger; diarrhœa checked; temperature 101°; pulse 100.

May 11th.—On visiting her I found that since last seeing her she had been going on apparently well, remaining up for two or three hours daily, most of which time was spent in the open air, but her pulse was 120 and her temperature 102°. On examining her I noticed a discoloration of the skin on the side of the neck, just above the clavicles, which I at first thought was dirt, but a further investigation soon satisfied me that it was due to brown pigmentary staining; the same coloration was also visible in the skin covering the axillary border of the great pectoral muscle, and on the front of the abdomen just over Poupart's ligament on either side.

May 20th.—Temperature 102·4°, pulse 115. The glandular enlargements were not greater than a month before, nor did her strength appear much impaired, but the pigmentary staining had greatly extended and become much darker. In the neck it reached on either side nearly as high as the ears. From the axillary margin it went down the arm, fading away about the insertion of the deltoid; it extended as high as the clavicle, and went half way across the chest in front. The whole skin over the abdomen was pale brown, the colour deepening into a dark brown over Poupart's ligaments. On either arm, between the insertion of the deltoid and the elbow, were seen a few scattered patches, but there was no staining on forearms or hands. On the legs there was distinct bronzing over the patellar ligaments, and on either side of the patellæ, but no discoloration elsewhere except a few small patches in the outer and upper surfaces of the thighs, about the size of three-penny pieces, similar to the spots on the arm.

There was not at any time the slightest trace of pigmentation on face, hands, or feet, or on any part of the mucous membrane of the mouth. At this time the peculiar dryness of the skin was very noticeable.

June 1st.—Saw her again, the pyrexia still marked; the area of pigmentation had not extended, but the colour had deepened. She was now beginning to lose flesh and strength.

On June 8th my friend Dr. Graves saw the case with me. Her condition was unaltered from my previous visit, but from this date she gradually grew weaker, her appetite failed very much, and she began to complain occasionally of a pain in her right side, and on some nights she coughed a good deal.

On June 30th I carefully examined her chest, but detected no physical signs save a few mucous râles at both bases. After the most careful percussion I failed to find any evidence of enlarged mediastinal or bronchial glands.

All through July she slowly got worse, her temperature never falling below 102°, or her pulse below 120, but the pigmented surface did not grow larger nor did the colour darken, nor was there any increase in the size of the various glands. Early in August she began to suffer much from headache and pain in the left ear; and on the 6th a very fœtid watery discharge commenced to flow from it; and her friends noticed that, after some days, the glands under that ear appeared to diminish in size. From the 8th to the 10th of August the pain in the head was intense, but by the 11th she had fallen into a drowsy semi-comatose condition, in which she continued until her death, which occurred on the afternoon of the 16th of August. For ten or twelve hours before death her breathing exhibited the Cheyne-Stokes rhythm. Thus sadly terminated an illness lasting about seven months from the first appearance of any symptoms. No autopsy was allowed.

Remarks.—First, as to the diagnosis. Commencing with enlargement of the cervical glands, and some slight failure of health, one can readily understand its being considered merely an ordinary case of scrofula in the institution where the child first became ill, but when she came under my care the gravity of the case was plain from the pyrexia, prostration, and anæmia.

On examination I excluded leukhæmia for the following reasons:—

1. The enlargement of the cervical glands was the first symptom noticed.

2. There was only a very slight increase in the size of the spleen; no enlargement of the liver; no fulness or tenderness of the abdomen.

3. There was no history of any ecchymoses or of any bleeding from any part of the body (nor was there any sign of either in the subsequent progress of the case).

After some consideration I was satisfied that I had to deal with the disease known as lymphadenoma.

That there was some increase in the number of the white corpuscles is very probable, such generally occurring in these cases.

Next, as to the symptoms and physical signs, the first thing worthy of note was the character of the cervical glands; they formed a complete chain from ear to ear, passing under the chin; they were nodulated, and inseparably fused with each other, but the skin was movable over them; they were very hard—a point in which true lymphadenoma differs from the so-called lymphatic leukhæmia in which the affected glands are generally soft and elastic. The post-cervical and the other enlarged glands also remained hard and freely movable.

At no time was the *anæmia* very profound; there was always a tinge of colour in the conjunctivæ of the lower lids and in the mucous membrane of the gums, though on looking at the child in bed the most noticeable thing was the contrast between her dark eyes, her bright malar flush (which continued almost to the very end), and the extreme pallor of the rest of her face and lips. The great *drowsiness* and the *disinclination to use her voice*—symptoms which she never lost—are described by Dr. Eustace Smith as very characteristic of the cachectic stage of this disease; so also was the peculiar dry rough feel, with powdery desquamation of the skin covering the abdomen, to which I referred in my notes.

The diarrhœa, the cough, and the physical signs in the lungs were probably due to some enlargement of the mesenteric and mediastinal glands respectively. But the most interesting symptom of all was the localised bronzing of the skin, which first

showed about three months after the illness began, gradually increased in intensity for six weeks, and then remained stationary until the fatal termination of the case. The pigmentation was almost altogether confined to the neck and trunk, and never appeared on the face, any part of the mucous membrane of the mouth, or on the hands or feet. I have searched through such records as the limited time at my disposal permitted without being able to find any account of a similar case. I presume the cause of the staining must have been the extension of the disease to the suprarenal capsules—a complication which, in a child of twelve and a half years, appears to be very rare.

A word in conclusion as to the treatment. I got her to take as much nourishing food as possible. I treated symptoms as they arose. I tried iron, iodide of potassium, cod-liver oil, and lastly, on two occasions, I pushed arsenic until constitutional symptoms (the chief being intense inflammation of the mucous membrane of the nose) warned me to stay my hand for a time. These symptoms came on only after she had taken, the first time 10 ms. of liq. arsenicalis three times daily for three weeks, and the second time the same dose for a fortnight. I did not try phosphorus; but no treatment seemed to have any favourable effect on the case.

NOTE ON SILVER-STAINING (ARGYRIA).

By ARTHUR WYNNE FOOT, M.D., Univ. Dubl.;
Senior Physician to the Meath Hospital;
Vice-President of the King and Queen's College of Physicians in Ireland

[Read in the Section of Medicine, December 16, 1887.]

It will be within the knowledge of the members of the Profession that some correspondence has taken place in the medical journals of late[a] on the subject of "discoloration of the skin by nitrate of silver." The gist of this discussion is merely as to the place of entrance of the silver into the body, for that discoloration of the skin was likely to follow the internal use of nitrate of silver has been known to all since the subject was brought before the Medico-Chirurgical Society of London by Dr. I. A. Albers, of Bremen, in a paper read before that body, November 14, 1815,[b] in which Albers reported a case of his own along with three others communicated to him by Dr. Schleiden, of Hamburg.

The point under discussion at present is the occurrence of staining after the local application of nitrate of silver to the throat. On the 22nd of October last Dr. Barclay Baron reported a case of discoloration of the skin by nitrate of silver used for swabbing the throat. On November 5th Dr. Wilks wrote that he had met with a similar case in a middle-aged woman who had never taken any nitrate of silver internally, but had been in the habit of applying it to her throat every day for two years. In the same number of the journal Dr. Duffey drew attention to a report of two similar cases given in the *Practitioner* in 1875 (Vol. XIV., p. 462).

It is in reference to this subject that I now offer a note on the occurrence of argyria or silver-staining from the long-continued

[a] Brit. Med. Jour., Oct. 22nd and Nov. 5th, 1887, pages 881 and 992.
[b] Med.-Chirurg. Trans. Vol. VII., p. 284.

employment of nitrate of silver to the throat. The drawing which I exhibit gives an admirable representation of the violet-gray metallic colour of the patient. The skin of the entire body was discoloured, but that of the uncovered parts, such as the face and hands, was most so. The nails and the mucous membranes of the mouth and eyes were stained. This drawing was made twelve years ago. The man is at present alive and well, and his condition is unchanged, except that he is not quite as dark as he was twelve years ago. At the time the drawing was made (1875) this man had excellent general health, and was about his business as a working jeweller every day. I examined his urine at that time for what is called "argentine albuminuria," and found no evidence of it. On the back of the drawing the notes written at the time were that thirteen or fourteen years previously he was under treatment in the Meath Hospital (under the care of the late Mr. Josiah Smyly) for "lumps in the throat." He had derived so much benefit from the use of solid nitrate of silver, locally applied, that after his discharge he provided himself with sticks of lunar caustic, and continued to apply them diligently for about eight years, when he desisted owing to the alteration in the colour of his skin becoming apparent. His appearance was peculiar and so remarkable that one day in the town of Waterford some children took fright at him and ran away, crying out that he was the devil.

There can be little doubt that in this case much of the nitrate of silver applied to the throat was swallowed, and so the case will come under the category of those who have taken silver nitrate internally for long periods because of chronic affections of the nervous system, such as tabes or epilepsy. Neumann has reported the case of a physician affected with ulcer of the stomach who, for several months, injected two or three times daily into his stomach by means of the œsophageal sound a solution containing about 1·5 gm. of silver nitrate. After about twelve doses the first indications of the discoloration are said to have appeared. This appears to have been an extremely large dose, equivalent to over 20 grains. It is remarkable that the attempts which have been repeatedly made to produce argyria artificially in animals by long-continued

feeding with silver nitrate have hitherto been always attended with negative results as regards the skin.

Microscopic examination of the human skin shows that, while the epithelial portions, the rete mucosum, and the glandular epithelium, are altogether free from depositions of silver, there are throughout the connective tissue portions of the skin accumulations of the finest granules of silver. These deposits of silver are most dense immediately beneath the epidermis in the uppermost layers of the papillary body and in the membranæ propriæ of the sweat-glands. It has been long observed that in these cases of silver-staining blisters rise white as they do in negroes, the dark granules of reduced silver lying chiefly in the cutis.

As to the chemistry of the process, Reimer's views are considered most probable. He assumes that the silver, having been reduced in the intestine, and being in a state of the finest subdivision, is taken up by the chyle-vessels, transported into the blood-current, and then deposited in the various organs. There is a difficulty in reconciling this view with the indisputable fact of the influence of light on the staining of uncovered parts, for the colour of the reduced silver can no longer be altered in any way by the light. Were it found in the tissues as the insoluble chloride the pigmentation would be very intelligible, as the white chloride is very sensitive to light, especially in the presence of organic matter, and it is upon this fact the phenomena of photography depend. *Post-mortem* examinations show that the discoloration is not limited to the skin and superficial mucous membranes, but may extend to the liver, spleen, kidneys, and intestinal mucous membrane. In the internal organs the deposited silver is chiefly in the walls of the smaller arteries. In the kidney the silver particles lie principally in the medullary zone, and give it a dark gray tint. The central nervous system appears to be exempt from depositions of silver granules.[a]

In the present state of our knowledge argyria must be considered an incurable affection. Neumann[b] alone reports that in a case

[a] Von Ziemssen. Handbook of Skin Diseases. P. 455.
[b] Von Ziemssen. Handbook of Skin Diseases. P. 455.

under his observation, according to the statement of the patient, the intensity of the stain decreased in the course of several years. Duhring[a] refers to two cases, reported by Dr. L. P. Yandell in the *American Practitioner* for 1872, where iodide of potassium together with mercurial vapour baths were successfully employed. The patients were syphilitic, and took from ten to sixty-grain doses thrice daily for a period of months. In both cases the fading of the discoloured skin was gradual; in one a faint trace remained, in the other the cure was complete. In the case of which I submit the facts in this paper the course I adopted was to give potassium iodide and sodium hyposulphite in alternate weeks—one week the iodide in ten-grain doses thrice daily, the next week the hyposulphite in twenty-grain doses as often. The object of this process was an attempt to convert the deposited silver into an iodide which is readily soluble in an alkaline hyposulphite, but it is very doubtful whether these changes can be effected in relation to the living body with the safety and certainty they can in the laboratory.

The man considered that his colour improved under this treatment, but as he would attend only as an out-patient, and was often absent in the country for considerable periods, the method did not receive a fair and patient trial.

As the discoloration of the skin after its prolonged use is not the only disadvantage of the silver nitrate, I was glad of late to come across Curci's[b] researches on the biological action of silver. In his communication thereon he recommends the double hyposulphite of sodium and silver, this salt being soluble, non-irritant, not coagulating albuminoids, and readily absorbable by the subcutaneous connective tissue. It is also very diffusible, and promptly absorbed by the mucous membrane. He claims for it that its action on the nervous system is surely and quickly obtained, and the risk of argyria is avoided. I have had the double hyposulphite made and given it repeatedly in half and three-quarter grain doses subcutaneously, and in half-grain doses by the mouth three times a day. Its taste is sweet, and it should be given fasting or hypo-

[a] P. 375. 3rd edition. 1883.

[b] London Med. Record. 1886. P. 210.

dermically. My experience with the double hyposulphite of sodium and silver has been limited, and I am not yet prepared to endorse all that has been said in its favour. Curci recommends that the internal use of the nitrate should be abandoned, since in contact with the mucous membrane it is rapidly altered, and may cause argyria even without its action upon the nervous system having ever been obtained.

A CASE OF CEREBRAL CYST.

By KENDAL FRANKS, M.D., Univ. Dubl.;

Fellow and Member of Council of the Royal College of Surgeons in Ireland;
Surgeon to the Adelaide Hospital.

[Read in the Medical Section, December 16, 1887.]

For various reasons I am glad that I have this opportunity of laying before the Medical Section of the Royal Academy of Medicine the details of a case which I think will be of interest to the members, chiefly on account of the questions of cerebral localisation which it opens up. Such questions are of great importance in the present day, when so many forces seem to combine to draw all organs of the body, and notably the brain, from out of the calm influence of the physician into the all-devouring surgical vortex. I need not, therefore, apologise to the members of the Medical Section for bringing this case under their notice, for I trust that they will express an opinion upon it, especially as to the degree of definiteness, in regard to localisation, which a case should present which should warrant the adduction of surgical aid:—

Case.—The case was that of a married lady, aged forty, who consulted me for the first time on the 7th of September last. Her husband, who accompanied her, gave the following history:—In June last she went out one hot day, in Devonshire, at 6 a.m., and walked about till noon, when she returned home. She complained much of the heat. She remained perfectly well till 8 30 p.m., when she suddenly fell on the floor in an unconscious condition. She was carried up to bed, and remained unconscious for two hours, though after the first half-hour she was able to be roused sufficiently to answer questions. She then went to sleep and awoke, quite conscious, at 3 a.m. It was noticed that after this attack her memory for words was affected. She could speak quite well for a time, but then some word would fail her. Three days later she had another attack, which was not so severe as the first,

but the memory for words was worse after it. Up to the middle of July similar attacks, but diminishing in intensity, occurred every four or five days. From that time till I saw her she had no definite attacks, but occasionally felt as if one were coming on, when she would sit or lie down until the sensation passed. These attacks were called faints by her friends; but after careful inquiry I satisfied myself that they were epileptiform in character. It was observed that after each attack her memory for words became distinctly worse. The first week in August she went to Eastbourne, and was there seen by Dr. Crichton. A week later she visited her sister in County Kilkenny, and subsequently went on a visit to another sister near Bray.

When I first saw her I ascertained that she had always enjoyed excellent health. She had been eight and a half years married, and had six children, all of whom were healthy. Her appetite was always very good, and the functions were normal. Her husband told me that previously to the first attack he had thought her not very well for two months. She complained much of the heat, but there had been nothing apparently the matter with her. He attributed her illness to the effects of sunstroke.

I found her looking in very good health. The only thing apparently wrong was a certain amount of aphasia. This consisted entirely in the forgetfulnes of certain words. Some sentences were perfectly clear and well expressed. Then, again she would forget the name of a chair, or point to her head and ask for the word. She was aphasic, but the aphasia was not well defined or absolute, and was of the *amnesic* variety. There were no paralyses whatever.

I explained to the husband that I thought her case was a very serious one. There was some affection of the brain, but what its nature was, or its exact position, I could not say, more than that it was located on the left side. She complained of occasional headache, which she referred to the top of her head, to the region of the coronal suture, and which she stated was worse on the left than on the right side. As they purposed returning to England in a few days, I advised the husband to place his wife under medical care, and if they passed through London to consult Dr. Ferrier about her.

In the absence of any more definite indication, and looking upon the attacks as epileptiform, I placed her, in the first instance, on a mixture containing bromides, digitalis, and arsenic. Of this mixture

she only took two doses. After the first, the headache, she said, was distinctly better, but after the second she vomited. The following evening she became restless, partially delirious, and the pain in the top of the head very severe, and vomiting incessant. I saw her at 6 30 p.m. on the 9th. She was then suffering from persistent cerebral vomiting. The tongue was quite clean. She was constantly moaning and complaining of the pain in the top of her head, chiefly on the left side. The aphasic symptoms were more marked. The pulse was slow. I at once shaved a patch on the left side of the head, about 4 inches by 3, and applied a blister. She also got 3 grains of calomel and an opiate draught. The result was that she had a quiet night, and the next day the headache and vomiting were better. On the night of the 10th the violent symptoms returned, but on the 12th she was so much better that she was moved downstairs, and had subsequently a good night. On the 14th of September cerebral vomiting, intense pain in the head, and slowness and weakness of the pulse came on. Since the night before she had not been able to pass urine. I asked Dr. Head to see her with me. A catheter passed drew off 10 ozs. of healthy urine. Sinapisms were applied to the back of the neck and over the cardiac region. The next morning Dr. Head again saw her in consultation. We then discussed the question of operation, and the chances which it might afford. The conclusions arrived at were that there was a tumour or an abscess in the brain, but that the weight of evidence was strongly in favour of tumour; that the aphasia pointed to the left side of the head, but that the aphasia was not sufficiently definite in itself to localise the tumour, and that the total absence of all paralytic or spasmodic symptoms rendered localisation impossible. Under these circumstances, we agreed that we could not recommend any operation. These facts were fully explained to the husband, and we told him that until some symptom arose which would more clearly indicate the position of the tumour, we could not advise an attempt in which the chances of success were so small. After consultation we decided to put her on small doses of calomel and extract of cannabis indica (½ grain of each) three times a day. For some days afterwards she seemed to improve slowly, the pain in the head was not acute when sitting up and perfectly quiet, but any attempt at movement, or trying to lie on the left side, brought on a spasm of pain, with weakness of the pulse, pallor and coldness of the extremities. Immediately after each spasm of pain the sight

became rather dim for some time, and then she became drowsy and inclined to sleep. A note taken at the time states that "her memory seems bad for recent events. She repeatedly asks the same question, and seems to forget the answer."

There also seemed to be some paralytic condition of the bladder, as she was totally unable to pass urine, and the catheter had to be passed four or five times a day. This began on the 13th of September, but five days later she regained power over the viscus, and the catheter was abandoned, to be resumed, however, ten days later, when the paralytic condition returned. On the 17th of September she again had a bad turn, with violent pain and vomiting. An appointment was made with Dr. Head for a consultation on the morrow, but in the morning she had again improved so much that her husband wrote to postpone it.

As there was some difficulty in keeping the blister on the head open, and as it seemed to have relieved the pain, on the 19th, with Dr. Head's approval, I made an issue about the size of a shilling in the same place. The pain in the head gradually got less, but occasionally she had acute exacerbations.

On the 22nd of September her condition seemed much improved. She had no pain in the head, her colour was good, and she seemed brighter and clearer than she had been for days. There was no fœtor of the breath, but the gums seemed slightly tender; the calomel in the pills was stopped, and she was given cannabis indica alone. The pulse was very variable—sometimes 60, and in a few minutes rising to 90, and soon falling again. Each day she was moved into an arm-chair for some hours, until the 28th, after which she did not like to be disturbed. There was very little alteration in the symptoms until the 28th, when she first became incoherent in the afternoon, and very drowsy. The calomel was again resorted to—½ grain every third hour. The pulse fell to 50–55 in the minute, and was very weak. The paralytic condition of the bladder reappeared, necessitating the use of the catheter. Some days previously she complained that she could not see people standing on the right side of the bed distinctly, that they were all blurred, but that she could see them well on the left side, and she asked that we should move to that side. Dr. Head saw her by himself on the 2nd of October, as I was absent in the country. Mr. Swanzy, who saw her with me in consultation on October 3rd, stated the paresis of the right external rectus was so slight that it could not be detected by the eye. The ophthalmoscope revealed

an optic neuritis so slight that it was almost imperceptible. Subsequent to this, at my request, Mr. Swanzy called upon Dr. Head, and they discussed the case. Dr. Head then wrote to me to the effect that, in the absence of any localising symptom, he did not consider an operation would be prudent.

The day following Mr. Swanzy's examination I found that she had partial paralysis of the soft palate, giving rise to a certain amount of stertor, but fluids did not return through the nose.

On the 3rd of October my attention was called by her friends to what they called drooping of the left eyelid. I made a careful examination and found that there was no true ptosis of the left eye, but that there was a partial paralysis of the right orbicularis. She could open both her eyes well, but the right eye closed more slowly and less perfectly than the left. This gave a wide-awake intelligent look to the right eye, which her semi-unconscious drowsy condition belied.

On the 4th of October the stupor increased. During sleep she snored loudly; in her waking moments she was unable to speak, and she put out her tongue only when told to do so repeatedly. That day I again spoke to her husband on the subject of operation, and put before him the state of the case. I told him plainly that the case was hopeless, and that the position of the tumour was quite uncertain, except that it was situated in the left side of the brain. I asked him if he would like an attempt made to reach it, but he replied that, with so many chances against us, he would not give his consent. I then told him that, under the circumstances, I could not honestly recommend it, and that in this opinion Dr. Head coincided.

On the 5th of October she began to pass under her in the bed. The first time this occurred she was apparently conscious of the act, as she made signs to the nurse, but on subsequent occasions she seemed quite unconscious of it. She lay sunk down in bed in a condition of absolute unconsciousness. Up to this the pulse had been slow, and she had taken a fair amount of nourishment in the intervals of the attacks of retching. On the evening of the 6th the pulse began to rise, marking 100 in the minute.

On the 8th of October her condition of profound coma was unaltered, but the pulse was still rising.

On the evening of the 9th the pulse had reached 150. It had not yet begun to flicker. The comatose condition was unchanged.

The patient died the following evening, October 10th, at 7 30

p.m. The next morning, having received the consent of the relatives to a *post-mortem* examination being made, I telegraphed to Dr. Bewley, asking him to bring down the necessary instruments in order to examine the brain. Dr. Bewley made the *post mortem* that afternoon, twenty-two hours after death, in my presence. He reported:—

"The following is a brief account of the condition in which the brain of Mrs. —— was found at the *post-mortem* examination:— The skull and membranes of the brain were perfectly healthy. The surface of the brain appeared quite normal in every part, except that the left *posterior* part of the brain seemed rather softer to the touch than the opposite side. In the left temporo-sphenoidal lobe there was a large cavity, apparently measuring about two inches in antero-posterior diameter. This cyst was separated from the surface by a thin layer of healthy brain tissue—it had pushed the posterior part of the left lateral ventricle inwards towards the middle line. The cyst was lined by a soft, flocculent grayish-red layer of tissue; it was not like a regular cyst wall, but gave the idea of disintegrating brain tissue. The cyst was filled with clear serous fluid. The rest of the brain appeared normal. The lining (or rather tissue) of the cyst on microscopic examination showed nothing but some brain tissue and blood vessels. There was no sign of old hæmorrhage (hæmatoidin crystals or other remains of blood-clot) or of inflammation."

I may add that the cyst described above by Dr. Bewley occupied the posterior portion of the temporo-sphenoidal lobe.

I will now shortly summarise the symptoms which appeared in this case. The first symptom was an epileptiform attack, which occurred early in June. There were recurrences of these fits at short intervals of a few days, which gradually grew less intense until about the middle of July, when they became so slight as to appear only as very mild attacks of *petit mal*. The relatives had no recollection of any muscular twitchings or convulsive movements. The next symptom was a form of aphasia which showed itself immediately after the first epileptiform fit in a very slight degree, but which became intensified after each subsequent fit. The aphasia was distinctly of the amnesic variety. Thirdly, we found headache over the top of the head, corresponding to the

coronal suture, and which was worse on the left than on the right side. This pain had violent exacerbations, was increased by movements, and made it impossible to her to lie on the left side. Fourthly in the order of sequence, cerebral vomiting, which appeared for the first time on the 9th of September, two days after I first saw her. Fifthly, a paralytic condition of the bladder, appearing first on the 13th of September, lasting for five days, disappearing again for ten days, and again returning and lasting till coma supervened. Sixthly, about the 25th of September, some inappreciable paresis of the right internal rectus. Seventhly, on the 3rd of October, a partial paralysis of the right orbicularis muscle. Eighthly, on the 4th of October, partial paralysis of the soft palate. The supervention of coma was gradual. The first symptoms of it may be said to have appeared thirteen days before death, but it did not become profound until October 5th, five days before her demise.

During the whole period the pulse was very variable, generally below normal, and becoming very slow during the exacerbations of pain and cerebral vomiting.

Taking all these symptoms together, I do not think it was very difficult, even at an early stage, to arrive at the diagnosis of cerebral tumour. But, when we come to the question of localisation, it is an entirely different matter. No well-defined motor centre in the cortex of the brain seemed involved. There was no paralysis of the extremities or trunk, except it be the condition of the bladder, which, in some inexplicable way, disappeared for ten days, and this affords no help in solving the problem.

We then must fall back (1) on a paresis of the right external rectus, so slight that it was evidenced only by diplopia; (2) a very slight amount of paresis of the right orbicularis; and (3) a partial paralysis of the soft palate. To attempt to localise a tumour from these symptoms, I conceive, would end only in chaos. We must then fall back on the aphasic symptom, and on that alone. The aphasia I have mentioned was not complete. It was distinctly of the amnesic variety. Its incomplete nature was such that, taken with the evident symptoms of severe cerebral pressure, it had little

value as a localising symptom. It could easily be accounted for by simple communicated pressure. But, even if it had been more pronounced and better marked, where would it have indicated the lesion to be situated? Certainly not in Broca's space. See what Dr. Ross says in his "Treatise on Diseases of the Nervous System," Second Edition, Vol. II., p. 552:—"In amnesic aphasia, the lesion is localised in the area of distribution of the posterior and terminal branches of the left middle cerebral artery, and the region of softening comprises the supra-marginal and postero-parietal lobules, the angular gyrus (visual centre), the posterior part of the infra-marginal convolution (acoustic centre), and the convolutions bounding the parallel and collateral fissures."

The region here indicated is situated above the cavity formed by the cyst in the temporo-sphenoidal lobe, and had trephining been performed, this region would have been the more rational one to have adopted instead of over Broca's space.

In corroboration of the fact, generally recognised, that tumours or lesions in the temporo-sphenoidal lobe afford few indications during life by means of which the disease can be located, I may mention a case, reported by Dr. Glynn and referred to by Dr. Ross,[a] in which the *post mortem* revealed a circumscribed abscess in the temporo-sphenoidal lobe. In this case the localising symptoms were caused by pressure on the cranial nerves at the base of the skull, and the case is particularly interesting in this connection, as it exhibited a train of symptoms totally unlike those exhibited by the case which I have brought before you.

Before bringing this paper to a close I would call attention to the nature of the cyst, which was found to occupy the posterior portion of the temporo-sphenoidal lobe. It was about two inches in diameter, and contained clear serum. There was no true cyst-wall. It was surrounded by softening brain tissue. There was nothing whatever in connection with it to suggest an abscess. There were no evidences of blood-clot or of inflammation. The microscopic appearances corroborated the clinical history that its origin was non-inflammatory.

[a] Op. cit., Vol. II., p. 534.

I am not prepared to hazard an opinion as to its true nature. Perhaps some of the members of the Academy may be able to throw some light upon the question. Judging by the condition of the brain tissue around, it would seem as if some slow process of disintegration were going on, and that to this gradual process of destruction or softening of the brain tissue round the cavity the fatal result was due, more than to the pressure of fluid within the cavity.

Another question which arises is whether evacuation of the fluid would have arrested this process. Supposing that the skull had been trephined directly over this cyst, and the intervening healthy brain tissue had been incised and the cavity emptied, no doubt the symptoms of brain pressure would have been relieved; but would the disease have been arrested and the case cured? I think it is too much to assume that such would have been the case.

I am aware that it is not always expedient to bring the details of a private case before a public meeting of scientific men, but it is not by any means unusual. Circumstances determine the expediency, and in the present instance I believe I am amply justified in the course I have adopted.

The case can scarcely be now called a private one, since the lay public have been instructed on the points at issue, and the details are already sufficiently widely known. This form of publicity I cannot commend, but I have no hesitation in laying the facts before my professional brethren and asking for their judgment upon the whole case.

CONGENITAL SPASTIC PARALYSIS AND ATAXIC PARAPLEGIA.

By C. J. NIXON, M.B., LL.D., Univ. Dubl.;
Professor of Practice of Medicine and Pathology, Catholic University.

[Read before the Medical Section, Jan. 27, 1888.]

Spastic paralysis occurring in children would appear to be, in origin, congenital or acquired; in distribution, hemiplegic, paraplegic, irregular, or general; and as regards the site of the paralytic lesion, cerebral or spinal. The congenital forms may be tabulated as follows:—

(*a*) Cases where there is some arrest of development of the motor tracts in the brain or spinal cord.

(*b*) Certain forms of nervous intra-uterine disease.

(*c*) Cases where the brain or spinal cord has been injured during delivery.

The three conditions which appear to be met with most frequently are:—

Porencephalus cerebralis; injury to the motor cerebral centres by instrumental delivery; injury to the vertebral column and spinal cord by excessive traction during delivery.

Porencephalus was a term originally introduced by Heschl[a] to indicate the appearance of an excavation, usually filled with serous fluid, on the surface of the cerebral hemisphere, at the bottom of which was an opening leading into the lateral ventricle. Kundrat,[b] who specially studied this condition, extends its signification and applies it to all defects in which absence of tissue is a prominent

[a] Gehirndefect und Hydrocephalus. Prager Vierteljahrschrift. Bd. LXI. 1869.

[b] Die Porencephalie: eine anatomische Studie. Graz. 1882.

feature. In 34 cases of infantile spastic paraplegia, recorded by M'Nutt in the *American Journal of Medical Science*, 1885, the striking point is demonstrated that in all a gross defect of the cerebral cortex existed corresponding to the fissure of Rolando.

From injury during birth, due most frequently to the pressure of the forceps, the upper part of the Rolandic area is involved—viz., the leg centres, either by direct effect of pressure or by a meningeal hæmorrhage limited to the upper part of the central convolutions. As a result of this, a descending degeneration of the pyramidal tracts, which are distributed to the lower extremities, is set up. It is remarkable that in those cases the condition of the lower limbs, as far as contracture and myotatic irritability are concerned, is somewhat different from what is ordinarily observed in paralysis depending on one-sided cerebral disease, being like that which is met with in the upper limb in cases of hemiplegia with late rigidity. However, in the condition under consideration, the innervation of the legs is interfered with from both hemispheres; hence the condition of the lower is approximate to that of the upper limb in hemiplegic paralysis.

In a number of cases of spastic paraplegia of infancy which came under the observation of Dr. Ross,[a] the children were born with their feet foremost, and he is inclined to believe that injury may have been done to the vertebral column and spinal cord by undue traction exercised during delivery. The injury to a vertebra or the occurrence of a spinal meningeal hæmorrhage, would be likely to set up a transverse myelitis from which a descending degeneration of the pyramidal tracts would arise.

In those cases of congenital paraplegia where there is no history of injury, the lesion must arise from intra-uterine disease or arrest of development of the motor tracts.

The case which I have the honour of exhibiting to the Academy illustrates, I believe, the form of congenital spastic paraplegia, which owes its origin to an injury inflicted on the brain by instrumental delivery, and the notes of it are briefly as follows:—

[a] The Diseases of the Nervous System. Ross. Vol. II. P. 485.

Case I.—J. D., aged sixteen years, was admitted into the Mater Misericordiæ Hospital on 20th of November last, complaining of weakness and rigidity of the legs. Both had been paralysed since birth. His family history is a good one; both parents are living and healthy, and all his brothers and sisters, six in number, are strong and free from all symptoms of nervous disease. His mother's labours were normal, except in his own case, he being born after a very tedious labour, in which the forceps had to be used.

Present Condition.—The boy upon admission to hospital, and at present, is of very spare habit, and of a clear, healthy complexion. He is fairly intelligent; but he states that at school he is not as quick as his class-mates. The most striking point about him, on superficial examination, is his peculiar walk. The gait is waddling, with a marked tendency to a twist of the trunk to the left side. The legs are never fully extended upon the thighs, owing to a permanent contracture of the ham-string muscles, and as each is drawn forward in progression, it describes an arc with its convexity outwards—the arcs formed by the movements of the two limbs intersecting in front—so that to some extent the mode of progression is cross-legged. The tip and inner part of each foot come first in contact with the ground, each forward movement being indicated by a scraping noise. There is a marked inclination of the knees towards each other, owing to the contraction of the adductors, whilst the feet incline considerably outwards. The left leg on examination was found to be one inch shorter than the right, which accounts for the swaying of the trunk in progression towards the left side. An examination of the reflexes disclosed the following:—

Superficial.—Plantar, cremasteric, and epigastric reflexes are completely absent.

Deep.—The patellar-tendon and quadriceps reflexes are most markedly exaggerated; in the right leg, a tap upon the quadriceps tendon gives rise to general tremulation of the limb. Ankle clonus is not constantly present, but occasionally it is capable of being produced to a marked extent. There is at times a considerable increase in the tension of the calf muscles, so that a condition of talipes equinus is produced. When the patient lies down in bed the foot is rigidly extended upon the leg, and the leg upon the thigh, whilst the great toe is flexed at the metatarso-phalangeal joint. When the contracture in the calf muscles is in any way increased, ankle clonus cannot be elicited. There is no evidence

of there being any lesion of sensibility. The limbs are but poorly nourished, but present no signs of trophic disturbance. Although the patient stated there was nothing wrong with his arms, upon examination it was found that there was some rigidity of the right upper extremity, the forearm being slightly bent upon the arm, and the former incapable of complete extension. The elbow reflex upon the right side was very lively. The dynamometer registered a pressure of the right hand equal to 50 lbs., whilst the pressure of the left amounted to 65 lbs.; the boy states he is left-handed. His height is 5 feet 4 in. The head and face are somewhat peculiar in appearance, presenting some indications of the microcephalic type. The upper lateral portions of the parietal bones are flattened to a slight extent, and the two planes meet in an upward projection of the vertex. The circumference of the head measures 21½ in.

It is scarcely correct to describe the case as one of paraplegia, considering the implication of the upper extremity in the paralysis. But whilst the lesion in the arm is of a comparatively trivial nature, that of both legs gives to the case the distinctive character of paraplegia.

The distribution of the paralysis shows that it is of cerebral origin; the history of the case as to the instrumental delivery and the existence of paralysis from birth, point, I believe, to an injury of the upper part of the central convolutions, affecting the leg centres, and to a partial extent that of the right upper limb.

It has been noted in cases of congenital spastic paraplegia that whilst the patellar-tendon reflex is exaggerated, ankle clonus cannot, as a rule, be produced. This is accounted for by assuming that an arrested development takes place in those parts of the pyramidal tracts which are distributed to the legs. I think in most of those cases the contraction which exists in the calf muscles opposes the development of a condition upon which ankle clonus depends.

The absence of the skin reflexes contrasts markedly with the exaggeration of the tendinous ones. This is interesting in connection with the observations of Rosenbach and Jastrowitz that superficial reflexes are lessened or abolished in cases of cerebral disease.

The second case brought under the notice of the Academy is one of ataxic paraplegia, and the notes in connection with it are briefly as follows:—

Case II.—Mrs. O'G., aged twenty-six, is the mother of two children, both of whom are living and healthy. There is no history of any nervous disease in her family; she has never had gout, rheumatism, or syphilis. Except for some slight irregularities in menstruation, the patient's health was good up to May, 1883. At this time she complained of frequent desire to micturate, which was accompanied by some symptoms of retention; her sight became impaired; she suffered from pain in the lower part of the back upon exertion; and occasionally her left leg became stiff, weak, and painful across the thigh, to such a degree as to necessitate her resting for a time, when these symptoms passed away. In the course of a few months all trouble completely subsided. She married in 1884, and continued in good health up to August, 1887, when she had a miscarriage, attended with considerable loss of blood. Two months afterwards, the weakness and rigidity of the left leg returned; she suffered from a constant dull pain over the lower part of the back, in the sacral region; and she had incontinence of urine, especially occurring at night. In a short time she remarked that her right leg became affected, and she had some difficulty in walking without staggering. She had never had any painful sensation in the legs, evidences of paræsthesia, or girdle zone. The difficulty in walking gradually progressed; it became intensified in the absence of light; and to obtain relief the patient presented herself at hospital. Her present condition may be summarised as follows:—She has marked signs of ataxy in the lower limbs, shown by the unsteady character of her walk; her inability to stand erect with the eyes closed; and, even with the exercise of vision, equilibrium is with difficulty maintained in the erect position. She has the ordinary signs of ataxy when lying in bed, such as the inability to determine the position of the limbs, or execute with precision any complicated movement with the feet or toes. When standing, the irregular movements of the tendons upon the dorsum of the foot were at times to be observed. The mode of walking is not, however, characteristically that of locomotor ataxy. The legs are more or less rigid, drag to some extent, and shake from clonus usually when the patient begins to walk, and sometimes when she suddenly stands still. The front of the foot is

brought first to the ground. She finds the legs sometimes quite rigid when lying in bed. The left leg she finds weaker than the right one. There is no lesion of sensibility, either tactile or common, to be noted. All the deep reflexes are markedly exaggerated. Ankle clonus is produced by the least attempt at flexure of the ankle-joint. A rectus clonus can also be readily produced, and, on direct stimulation, a clonus in the vastus internus muscle. A very peculiar point noticed in connection with the motor paralysis is its variability in its amount. At times she can walk fairly well, and without assistance; at other times she is almost completely powerless. The arms are not affected to any extent recognisable by objective signs. The patient, however, states that her right arm is not as strong as usual, and that she does not write quite as well as formerly. There is now no defect of vision; pupils respond to light and accommodation. They are unequal in size, the right being small and irregular. This is due to a partial posterior synechia, the result of an old attack of iritis. There is no impairment of articulation or tremor in any of the muscles present. The urine is normal in reaction and in quality. There is no affection of the bladder or ureters.

The case just narrated is an instance of one of the compound system degenerations of the spinal cord to which considerable attention has been given since Westphal first noticed the conditions in 1878.[a] At present only one other compound system degeneration is recognised as a distinct type of disease—viz., amyotrophic lateral sclerosis—an example of which I had an opportunity of bringing before the Medical Society of the College of Physicians in 1879.

Although the symptoms of ataxic paraplegia correspond in certain respects to those of locomotor ataxy and of lateral spinal sclerosis, in certain points it differs from both of these affections. In ataxic paraplegia, while there is marked inco-ordination of movement, the sensory nerves do not appear to be implicated, either peripherally or in the spinal cord. This explains the persistence of myotatic irritability, the absence of lightning pains in

[a] Uber combinirte (primäre) Erkrankung der Rückenmarkstrände. Arch. f. Psychiatrie, Bd. xi. 1878.

the limbs and of any lesion of tactile sensibility. It seems almost certain that co-ordination of muscular movement, although usually involving a complex mechanism, depends mainly on the existence of sensory muscle-nerves. The fact that ataxy of the most pronounced character may be present where disease is exclusively confined to the peripheral nerves, as in some cases of locomotor ataxy, shows that the condition may be due to implication of a single one of the mechanisms involved in co-ordination, whilst the ascertained fact that there is no necessary relation between loss of either tactile or common sensibility and co-ordinating power, apart from other considerations, compels us to admit the existence of sensory muscle-nerves. That these sensory muscle-nerves pass to the cord by the posterior roots of the spinal nerves, and that they are first distributed in the external root-zone, the analogies of disease abundantly prove. Lesions in either of these situations give rise to lightning pains, disturbances of sensibility, and probably extinction or impairment of the reflexes. Beyond these paths the course taken by ordinary sensory impressions and those coming from the muscles, appears to be different, and if so, a lesion which affects alone the paths for the sensory muscle-nerves, may be attended by ataxy alone. A very important case recorded by Gilbert in the "Archives de Neurologie," 1882, lends strong support to this view. In the instance referred to, a stab inflicted in the dorsal region of the spine produced complete motor paralysis in the left leg, with loss of cutaneous sensibility in the right. On the side of motor paralysis, although sensibility was unimpaired, the sense of posture was completely lost and the patient could not tell whether his leg was extended or flexed, and the condition passed into complete ataxy. On the other hand, in the right leg, in which sensibility was impaired, the sense of posture was present, and no signs of ataxy developed themselves. This case goes, at least, to show that whilst the nerves conducting tactile impressions decussate in the cord, those conducting muscular sense impressions do not. What, then, is the position of the sensory-muscular tracts in the cord? Before attempting to answer this question, in the light of experiences gleaned from experiments of disease, I may point out

the peculiarities alluded to by Gowers in describing the pathological anatomy of ataxic paraplegia—1st, that in nearly all the cases of ataxic paraplegia in which there has been an opportunity of examining the spinal cord, the sclerosis has been found to be less intense in the neighbourhood of the root zone of the postero-external column than is the case in tabes, thus accounting for the non-interference with the reflex arc, and the absence of signs of irritation in the posterior nerve roots. 2ndly, in ataxic paraplegia, the disease is often more intense in the dorsal than in the lumbar region of the cord; whilst in tabes the process of sclerosis is so widespread and intense over the entire posterior column in the lumbar region as to suggest that the affection of the column of Goll is one of an ascending degeneration; and thirdly—and to this, I think, most importance should be attached—the sclerosis in ataxic paraplegia occupies that region of the spinal cord in which the short vertical fibres run which connect the posterior grey matter at different levels. These fibres would appear to play a significant *role* in the causation of ataxy. They constitute the "posterior ground fibres" of Flechsig, have a course upwards and downwards of only four or five centimetres, and give rise in the middle of the anterior third of the external column in the dorsal region to a descending degeneration of a comma-shaped bundle of fibres. When we reflect how important it is for the purposes of co-ordination that the different spinal segments should be closely connected together, we can understand the importance of the function assigned to these fibres. Lastly, it is to be noted that in ataxic paraplegia the disease in the lateral columns usually involves the direct cerebellar tract, which, according to Flechsig, conducts muscular sensation from the lower part of the trunk.

It would seem, then, apparently correct, if three situations in the cord were mentioned as positions in which the sensory muscle tracts are met with, apart from their connection with the posterior horns of grey matter—viz., the columns of Goll, the direct cerebellar tracts, and the fibres constituting the posterior ground fibres of Flechsig.

Examining for a moment the nature and cause of the motor

paralysis which exists in ataxic paraplegia, I may say that the case exhibited illustrates in a marked degree the features usually noted in this condition. Although ataxy exists to a marked extent, the gait is more or less rigid. The legs are moved stiffly forwards in progression, and the front part of the foot is placed first upon the ground. The stage of ultimate spasm, in which clasp-knife rigidity and clonic spasm exist, has not yet been reached. The examination of the cord in cases of ataxic paraplegia shows that the affection of the pyramidal tracts may be in some cases so slight as to suggest a doubt of the paralysis being due to disease of these columns. There is, however, one element of obscurity which arises, in referring to the pyramidal tracts in explanation of motor paralysis. Taking the upper segment of the motor path, we can with comparative facility note the conditions of disease which affect it, from its origin in the motor area of the cerebral cortex down to its distribution in the anterior and lateral columns of the spinal cord. But between these pyramidal fibres and their terminations in the ganglion cells in the anterior grey horn, the motor fibres divide and subdivide in the intermediate grey matter into a delicate network of fibrillæ—the network of Gerlach—which join with the branching processes of the nerve cells of the anterior horn. As yet we have no proof of the existence of any lesion which is confined to these intermediate fibres, though it is easy to realise how a limited lesion in this region—limited both as to distribution and intensity—would be likely to produce serious disturbance of the motor function, whilst, except the disease affected universally the fibres of the entire area, the recognition of any morbid change might be a matter of insuperable difficulty. It should further be borne in mind that the distance of these fibres from their trophic centres renders them specially prone to disturbances of nutrition.

There is one point which must strike anyone who has had some experience in dealing with affections of the spinal cord attended with paralytic lesions—that in a certain proportion of cases signs of the most profound paralysis completely subside. We are prepared for this in certain instances—for example, in cases of compression myelitis, in acute anterior poliomyelitis, and in the

paralyses that follow concussion or hæmorrhage. But we are disposed to regard it as phenomenal if spinal paralyses outside this category gradually improve or recover. No doubt many cases of paralysis which have been regarded as central in origin are in reality due to peripheral neuritis; but, excluding these, cases undoubtedly depending upon central lesions, at least undistinguishable from those depending on central lesions, are met with in which signs of profound paralysis subside. One of the best marked instances of lateral spinal sclerosis which I have ever had under observation—a case which is recorded in the "Transactions of the Academy of Medicine" for 1884—got completely well in the course of some five or six months. It appears to me to be an error to assume the existence of sclerosis as a matter of routine opinion, or, even if that opinion be formed, that necessarily the lesion is irremediable. Notwithstanding the giant strides that have been made in the study of affections of the brain and spinal cord, we must admit that much more has been done in the direction of localisation, and in the determination of functions of nerve centres and tracts than in adding to our knowledge of the different pathological processes by which disease is originated. This is, after all, intelligible enough. Taking the cord alone, without its membranes, it is probable that morbid changes may arise in any one of the elements of which it is composed—ganglion cells, nerve fibres, connective tissue and neuroglia, blood-vessels and lymphatics. Will not the progress and termination of the lesion depend upon the tissue which is involved, upon whether the change is an inflammatory or degenerative one, or whether inflammation precedes degeneration or follows it? But, even apart from those cases where paralysis depends upon a change in structure, have we not abundant proof that conditions of toxæmia may produce profound lesion of function without any recognisable change of structure; and further, that these effects are produced on certain nervous structures by a process of selective affinity. I may mention as instances—the amaurosis produced by the use of tobacco, quinine, or alcohol; the local character of lead palsy; the motor paralysis which is developed in acute ascending paralysis—a

disease, it would seem, of bacterial origin; the effects upon the reflex function of the cord by the use of strychnin, or in tetanus; the limitation of the effects of curara to the termination of the lower motor segment. More suggestive even than any of these mentioned is the occurrence of eleven cases of spastic paraplegia, reported by Brunelli,[a] as the result of the use of a vetch (Lathyrus Cicera) as an article of diet.

Instances such as I have mentioned afford a hope that the treatment of some forms of spinal paralysis may be of greater avail in the future than it is at present. No doubt cases are benefited by certain remedies, and under their use recovery sometimes takes place. In cases of spastic paralysis I believe beneficial effects follow the use of arsenic, chloride of gold, cod-liver oil, and calabar-bean. In some cases the degree of paralysis seems to depend to a great extent upon a feeble circulation, due to a weak and excitable heart. This was specially the case with a lady suffering from lateral spinal paralysis whom I have been attending for the past seven years, and who has been seen frequently by Dr. Gowers, and once by Dr. Charlton Bastian. In very cold weather, or when from any condition the heart becomes unusually weak, the limbs are almost powerless as far as active exertion is concerned; but when the patient gets warm, or the action of the heart is strengthened, there is a considerable return of power in the legs. Her general condition has been much inproved by the use of iron and Fellow's Syrup, in addition to the drugs already enumerated, and she is gradually gaining power in the legs.

If we recognise these forms of spinal paralysis which do not pass into hopeless degeneration, or forms where the lesion is of a nature akin to toxæmia, may we not hope that, as the physiologist shows us the effect of substances like atropin, muscarin, or pilocarpin, and curara, on special parts of the nervous organism, the physician, with the advancement of medicine, " in dealing with many forms of paralysis, may introduce into the economy a molecular mechanism which, like a very cunningly devised torpedo, shall find its way to

[a] Sur une cause peu connue de la Tabes Dorsale Spasmodique.—Trans. of the International Med. Congress, Vol. II., 1881, p. 45.

some particular group of living elements and cause an explosion amongst them, leaving the rest untouched?"[a] Until then, if we are not disposed to rely upon the use of drugs which are tested either by scientific experiment or by varied experience, we may comply with a popular demand, and exhibit without risk some of the fashionable but useless drugs, the names of which form, probably, one-half of the contents of the Extra Pharmacopœia.

[a] Prof. Huxley. Address on the Connection of Biological Sciences with Medicine.—Lancet, Vol. II., 1881.

HEREDITY IN PURPURA HÆMORRHAGICA.

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[Read in the Section of Medicine, January 27, 1888.]

The case which forms the text for the communication which I have the honour to bring before the Medical Section occurred in the practice of my friend, Dr. Roughan, of the Frenchpark Dispensary. I was staying for a few days in the neighbourhood, and saw the patient, in consultation with Dr. Roughan, on the first day of his illness. He was a man of seventy years of age, who had enjoyed fairly good health up to that date. He was attacked with epistaxis in the morning, and, as this had resisted the usual household remedies, medical aid was summoned. We saw the patient about 3 p.m. The bleeding from the nose, principally, if not solely, from the right nostril, still continued steadily; it was moderately profuse. The loss of blood up to that time amounted to about a pint. It coagulated fairly well, and a pendent clot, up to an inch and a quarter in length, or so, always tended to form at the anterior part of the septum narium, when this region was left untouched for a few minutes. The patient was sitting upright in a chair, with the head leaning forward, and was naturally somewhat weakened by the loss of blood. What specially alarmed both him and his family, however, was the fact that an apparently similar attack had proved fatal to his son, a young man of twenty-one, about a year before.

On examining the patient, I observed some small ecchymotic patches on the temples, which led me to look over other parts of the surface, when I found that dermic extravasations—for the most part extremely minute—had formed here and there over the whole cutaneous area; they were best marked on the temples and

lower part of legs, but no part of the surface was quite free. The patient's attendants had already noticed them; and, on inquiry, I ascertained that, in the case of his son, already referred to, a similar phenomenon had occurred. The young man, like his father in the present instance, had been seized with epistaxis without assignable cause. Cutaneous extravasations began to form almost simultaneously. He was skilfully attended by Dr. Walsh, now of the Castlerea Dispensary, but the bleeding resisted everything that medical skill could devise. It persisted during the night, and, in the course of the second day, the patient "vomited up a basinful of black blood," and died soon after. This history interested me very much. Further questioning elicited no other peculiarities either of health or disease.

Our patient, whose epistaxis we were specially called upon to treat, was of a somewhat apathetic disposition, but appeared possessed of about average intelligence. The body was fairly well nourished; there was no more evidence of anæmia than would be accounted for by the loss of blood which had occurred during the present bleeding; a slight venous hum was heard over the external jugular vein; there was no œdema of the legs, and no evidence of organic disease of the heart; the pulse was beating regularly at the rate of 78 per minute, and was soft and compressible. The patient was now placed sitting bolt upright in a chair, with the feet in water containing mustard, as warm as could well be borne, and was taught to compress the right nostril with the left hand, while he held the right arm vertically above the head. Local astringents were applied at intervals; tr. fer. per. was administered by the mouth, and a full dose of ergotin hypodermically. All these things failed, however, to control the hæmorrhage; the blood escaped into the pharynx when prevented from passing by the nostril, and, after three-quarters of an hour of this experience, the purpuric rash was obviously increasing, while the epistaxis continued as before.

Accordingly, it was determined to plug the posterior nares—a procedure which I effected with the aid of a modification of Bellocq's cannula, ingeniously devised by Dr. Roughan, and much

more convenient and satisfactory in application than the original instrument. The plug was firmly lodged, and the nostril was also filled with lint, steeped, as was the posterior tampon, in turpentine, and firmly secured in position by knotting over it the ends of two ligatures attached to the plug behind.

During the operation of plugging I noticed that a slight abrasion, or, apparently, an amount of friction, which, ordinarily, would have had no effect, caused the mucous membrane to bleed freely; so that the escape of blood during the procedure was considerable. The patient, accordingly, felt faint when the operation was concluded; but I would not allow him to lie down for some time after, as I hoped that he should derive further hæmostatic advantages from the temporary cardiac weakness while in the upright position. When this latter symptom had passed away the patient was placed in bed as comfortably as we could make him, with the head raised, and the feet comfortably warm. Still, although the bleeding was checked, a slight oozing continued, and the coagulative power of the blood seemed diminished, so that it soaked *through* the compressed lint with comparative ease, although in small quantity. A supply of medicine (tincture of the perchloride of iron) was left with the patient, with directions for regular administration. I had, from the first, given the gravest possible prognosis; and, at our suggestion, a clergyman was at once sent for, and the rites of the Roman Catholic Church, of which the patient was a member, were administered before we left the house.

Dr. Roughan and I again saw the patient next day, and found him fairly comfortable, except that he complained a little of "the thing" in the back of his throat—meaning the plug. The same slight oozing of blood still continued. The pulse was now 72 per minute, soft and compressible, but apparently much more full than on the previous day. We did not think it advisable to disturb the plug. A hypodermic dose of ergotin was given, and the patient got an increased quantity of his iron styptic.

I did not see the patient again. Dr. Roughan afterwards informed me that he died on the following Thursday; the same oozing of blood having continued to the end, and the patient getting

gradually weaker. Dr. Roughan did not see him on the day of his death; but a letter which I received from a young friend of mine living in the neighbourhood, who is a highly distinguished graduate of Trinity College, and who, being much interested in our patient, saw him at frequent intervals, contained the following information:—That the patient "died on Thursday night, after lingering, but generally in a conscious state, until that time. The only observation I made about him was the strong, regular pulse, which remained until just before his death, or, at least, until a few hours of it, when I last felt him. It did not seem to have grown in the least fainter despite the loss of blood, which, at intervals, continued to trickle from the nostrils. He was able to take a beaten-up egg, and a few other things; but, for more than half the time after you left him, he remained in a sleepy or semi-conscious state, though when he awoke out of it he was wonderfully conscious."

This case presents several points of interest, whether we examine it with regard to the diagnosis, its pernicious tendency, or the history of heredity. The latter, as shown by the occurrence of a train of similar symptoms in father and son, involves a complication in the diagnosis, as it might lead some of us to think of hæmophilia, the hereditary tendency of which is usually much more pronounced, and which, in some cases at least, runs a very similar course. But the absence of any preceding indication of "love of bleeding" decided me in my original view of the case as one of the "morbus maculosus" of Werlhoff—more familiarly known by the name which I have placed at the head of this communication. I should also mention, before concluding, that there was no elevation of temperature, and no enlargement or tenderness of the joints, and that, although there was some melæna afterwards, it was not more than would be accounted for by swallowing of the blood which trickled down the pharynx from the posterior nares.

I do not think it advisable to lengthen this short note of an uncommon form of disease by discussing any of the thousand and one shadowy theories of purpura and hæmophilia which have up to the present been placed before the professional public. None of them appears to me to have any established basis of demonstrable

scientific facts. The peculiar clinical features of the case itself will, I trust, be accepted as a sufficient apology for my introduction of it to the notice of the members of the Section of Medicine of the Royal Academy of Medicine.

THE ETIOLOGY AND CLASSIFICATION OF THE ANÆMIA OF PUBERTY.

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[Read in the Section of Medicine, March 9, 1888.]

A LARGE number of girls suffer during puberty from a condition of ill-health characterised by a very constant train of symptoms, to which the names anæmia and chlorosis are applied. Although the disease is so common, its symptoms so plain, and the treatment, as a rule, so successful, the etiology is by no means well established, various theories being put forth by different writers.

Trousseau[a] considered it a neurosis, the blood-changes being secondary. Niemeyer[b] appears to consider it as a result of premature sexual activity. He writes: "According to my observation, obstinate chlorosis attacks all young girls without exception in whom the menses have appeared in the twelfth or thirteenth year, before the development of the breasts and pubes." Mitchell Bruce[c] says the origin of the disease lies in a peculiar condition of the blood and blood-vessels, which is believed to be congenital and perhaps hereditary. Aitken[d] considers chlorosis as one of the "functional diseases of the female organs of generation in the unimpregnated state." Sir Andrew Clark[e] considers "fæculent retention and its consequences" as the cause. Sée[f] looks upon

[a] Clinical Medicine. 1872. Vol. V., page 101.
[b] Textbook of Practical Medicine. Vol. II., sec. 3, chap. i.
[c] Quain's Dictionary of Medicine, art. Anæmia.
[d] Quoted by Sir Andrew Clarke in a paper read before the Medical Society of London, Nov. 14th, 1887.
[e] Medical Society of London, Nov. 14th. 1887.
[f] Quoted by Sir Andrew Clark.

the inability of the organism to meet the demands made upon it by the simultaneous advent of menstruation and of rapid growth of the tissues as the cause.

A great many predisposing and exciting causes have been described by various authors; most of these seem to be not so much causes as merely coincident with the time of life at which the disease begins, but, generally speaking, all things are causes which lessen metabolism and the power of the system to meet the demands made upon it—such, for instance, as want of exercise, improper food, and vitiated air, and the variety of the disease caused will depend greatly upon the force and direction of these causes.

The distribution of the disease bears this out. It is not confined to any class, but is more often met with in large towns than in the country, and is much more common amongst girls who sit at their work than amongst others. When it does occur amongst servants, defective drainage is often an exciting cause. In Dublin the disease is very common; yet in Huddersfield, where the great majority of the girls work from an early age in mills, it does not seem to be common, as, on looking over the notes of more than 600 cases treated there consecutively, I find only three examples of the disease, and one of these girls is specially noted as having a "sitting job" in a mill. The chief differences between the girls in Yorkshire towns and those in Dublin are that the former are better fed and have more exercise both at their work and after it.

But, although these causes are generally met with, sometimes they are absent, and the disease occurs in girls of good physique, living in country air, warmly clad, and well fed.

In Sir Andrew Clark's paper,[a] the graphic description of the patient's condition only dealt with one variety of the disease—that generally termed chlorosis; but other well-marked varieties of the anæmia of puberty are met with. I would venture to propose the following classification:—

1. Fat anæmia, where there is a well-marked deposit of adipose tissue.

[a] *Loc. cit.*

2. Anæmia of overgrowth, where there has been well-marked general increase of growth without much deposit of fat.

3. Anæmia of general malnutrition.

The first and second and the second and third may overlap, but never the first and third. In the first variety the symptoms of anæmia generally follow the deposit of fat in the tissues; in the second they follow the rapid growth; in the third they generally follow the appearance of the menses. The second and third (those in which there is no deposit of fat) are liable to be complicated by tubercular disease.

In spite of the great weight of Sir Andrew Clark's experience, I cannot look upon constipation as even an important cause of this anæmia. Constipation and anæmia are often associated, but very often the constipation is not greater than would be expected from the general sluggishness of the functions, and is similar in significance to the copious pale urine, of low specific gravity and deficient in urates, so generally associated with this anæmia. That the constipation is accompanied not only by torpidity, but also by loss of power, is shown by the failure of belladonna and nux vomica to relieve it.

Another argument against constipation being the cause of the disease is that cure often follows the use of iron in the form of Griffith's mixture or Bland's pills, without any purgatives being administered.

Habitual constipation is a common complaint, and as long as the bowels are evacuated regularly, uncomfortable symptoms seldom arise, no matter what the interval between the motions. There seems no reason why constipation should at one age and in one sex cause this characteristic train of symptoms, and produce none of these symptoms at other times.

In some curious cases the constipation is persistent through life, but is not accompanied by any definite symptoms except at puberty and the menopause, at both which periods there is palpitation and shortness of breath on exertion. In one case, at present under observation, there has been obstinate constipation, as a rule not more than one motion in nine days; the patient is now forty, and it

is only quite lately that the palpitation and shortness of breath have appeared.

With regard to the occurrence of the menses, my experience is very different to that of Niemeyer.[a] Early development and not premature menstruation seems the rule. Often the anæmia sets in without any appearance of the menses, but in many cases there has been a slight appearance for from one to three or four months, and then either a total cessation or an occasional slight appearance for a month or two, and then several months without any.

Generally speaking, I have found that in the anæmia of general malnutrition the menses may be absent, scanty, or, in rare cases, normal. In the anæmia of overgrowth there is an attempt at establishment of menses without development of the breasts, &c. The beginning of fatty anæmia is coincident with development of the breasts &c.

In the fatty anæmia there is certainly an hereditary acquired causation. It is very common to find several sisters affected. In one family I have noted four, in another three, and in several two so affected. In these cases I have often found that the mother has been married early in life, and I have learned to look upon this as an important factor. In one family of good means, and living in the country, the mother was eighteen years of age at the birth of her first child, she has had five sons and three daughters; all the sons have been very strong, but the daughters, although when young, strong and of healthy colour, have all passed through well-marked fatty anæmia. In another case the mother never suffered from anæmia; her first child, a daughter, was born when she was only seventeen; the child is now rapidly getting stout, has no appearance of the menses, and is, in fact, passing into fatty anæmia.

Another very interesting point in this variety of anæmia is, that if any strong call in a particular direction is made upon the system, it will be able to meet it; thus, there is generally marked shortness of breath and palpitation on going upstairs, and but little whilst walking not too rapidly on level ground—yet domestic servants, so anæmic as hardly to be able to walk on level ground,

[a] *Loc. cit.*

will sometimes be able to carry heavy weights upstairs. This I have never observed in the other forms of anæmia.

A most important contribution to the etiology of the disease has been made by Beneké,[a] who has shown that the annual increase in the heart and blood-vessels in girls up to puberty is 8 per cent. per annum, whilst during the establishment of menstruation it is 80 to 100 per cent.; so that if puberty is established in a single year an extra growth of from 70 to 90 per cent. weight in addition to ordinary growth is entailed, and that at the end of puberty the lungs have arrived at the fullest development, and the excretion of carbonic acid gas has reached its highest. There is no such rapid change in the male.

Professor Bowditch[b] says that up to eleven or twelve boys are, on the average, taller and heavier than girls; for the next two or three years girls have the advantage; whilst after fourteen or fifteen boys again excel in strength and height.

It is probable that the cause of this rapid development of the female is to be found in sexual selection. Men generally choose wives younger than themselves, and so women who are early sexually mature are most likely to be married and have offspring. In time this ought to cause a rapid maturity, and the general tendency would be emphasised in the offspring of mothers who were married young.

The parts affected in this rapid development are the various tissues derived from the mesoderm. The white cells and blood corpuscles, the heart and blood-vessels, the reproductive organs, and the supporting and connecting tissues are chiefly affected. During puberty the mesoderm is largely called upon by the rapid growth of the organs concerned in generation. If the system is unable to meet the demands made upon it, anæmia results. If badly undernourished, the system is almost certain to fail to meet the extra demands, and the anæmia of general malnutrition is established. If at the time the rapid growth of the organs of circulation and

[a] Der Ueber das Volumen des Herzens und die Weite der Arteria in den Verschiedenen Hebensalten. 1879.

[b] The Growth of Children. 1877.

reproduction is set up, there is active growth of the bones, muscles, and other tissues, the system may be overtaxed by the further demand, and the anæmia of overgrowth gradually appear. In a third class of cases the mesodermal energy is misdirected, and instead of the demand being supplied, an excessive amount of reserve tissue (possibly resulting in part from deficient oxidation) is formed, and fat anæmia develops.

That there is not only an accumulation of fat, but deficient growth and a fat substitution, is shown by the aorta of small calibre and the unequal thickness and fatty metamorphosis of the intima, which are so well-marked as to have led to the idea that the cause of the disease is a congenital condition of the blood and blood-vessels.[a]

With regard to prognosis and treatment, I would add only a few words. In the variety of anæmia associated with deposit of fat there is sufficient, but misapplied, vitality, and cure may be looked for. The treatment is twofold, specific and symptomatic. Iron may fairly be called a specific; introduced in quantities far exceeding the ordinary needs of the system, it does good, and often, without any assistance, cures. Dr. Oswald Schmiedeberg[b] says:—"The possibility cannot be denied that under conditions otherwise favourable and necessary to the cure, the formation of red blood corpuscles may be forced, even by an increase of the iron absorbed, which, though in itself minute, is kept up a considerable time because of a long-continued extra supply of the metal."

It seems probable that the iron acts by modifying the mesodermal growth and checking the excessive formation of a reserve material. Arsenic and the mineral acids also do good, but I believe not so rapidly.

As bearing on the specific action, I may mention that the syrup of the iodide of iron has seemed to me to act much more rapidly and effectively than the syrups of the phosphates and of the hypophosphites.

The form in which the iron is given must vary with the neces-

[a] *Cf.* Dr. Mitchell Bruce, *loc. cit.*

[b] "Elements of Pharmacology," 1887, p. 182.

sities of the case. As a rule I order four or five grains of the iron and aloes pill of the B. P. each night, or, if there is much constipation, each night and morning. In this form I have never found the iron disagree. If there is a catarrhal condition of the mucous membrane of the stomach, I use a mixture containing sulphate of magnesia and sulphuric acid, either adding sulphate of iron to it, or ordering the myrrh and iron pill of the B. P. In some forms of dyspepsia I find sulphate and carbonate of magnesia, with aromatic spirits of ammonia, act well in conjunction with the myrrh and iron pills. Very rapid improvement follows the use of the solution of perchloride of iron, B. P., but some cannot take it. I find, however, that it disagrees with comparatively few since I have prescribed it (on the suggestion of Dr. Cameron, of Huddersfield) with an equal quantity of spirits of nitrous æther. Hygienic treatment is also important. Fresh air, good food, especially meat, and moderate exercise are useful, but over-exertion is hurtful, and tends to prolong the anæmia, or even to render it permanent.

In the anæmia from overgrowth the prognosis is generally good, but the possibility of tubercular disease must not be overlooked. Fresh air, nourishment, especially milk, and comparative rest, are all important. Iron has not seemed to me to be so necessary—when given it is generally in the form of the syrups of the iodide and of the phosphates. If purgatives are required, I prefer the saline ones, and avoid aloes.

In the anæmia of general malnutrition the prognosis is bad; the excessive demand comes upon a system but badly able to fulfil its ordinary duties, and permanent debility generally results. In such cases country air, perfect rest, and plenty of milk and other easily assimilated food is what is required, and medicine is of secondary importance. I have found most benefit from the sulphates of iron, quinine and magnesia in combination with hydrobromic acid.

A CASE OF GASTRIC EPILEPSY.

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Vice-President of the King and Queen's College of Physicians in Ireland.

[Read in the Section of Medicine, March 9, 1888.]

In this communication the term gastric epilepsy is used in reference to epilepsy whose exciting cause is apparently due to the irritation of various kinds of food towards which the stomach exhibits an abnormal sensibility. The propriety of the term will be discussed by-and-by.

The subject of the case had, when three years old, an attack of what was regarded as cerebro-spinal meningitis. This was followed by very violent general chorea, which lasted for three weeks, after which one of his feet was for some time in a condition of talipes varus. There was no family history of epilepsy, but some neurotic traits were perceptible in his immediate relatives. His mother was of an excitable and emotional temperament, which might be socially called fussy and medically hysterical. His father died of paralysis, but it was induced by worry, overwork, and mental annoyance. One of his brothers suffered from brain failure after an attack of scarlatina. This collapse was marked by loss of memory, failure of power of application, and distaste for studies formerly relished. He recovered completely after prolonged rest.

The subject of the case was physically as strong and active as boys of his age, but was rather dull and retiring. He was not considered very forward. His education was effected slowly, from a disinclination to press him at lessons, because it was thought overstudy might be injurious to his brain on account of the severe attack he had when three years old. His tastes were quiet and unobtrusive. He was fond of gardening and of animals. His

skill in rearing plants, often under great difficulties, was only equalled by his success in taming and training animals, over which he seemed to exercise a kind of fascination, which appeared to be reciprocated. These powers showed him to be possessed of much patience and close observation, combined with kindness and gentleness.

At the age of seventeen he had, in midwinter, an attack of scarlatina, which was not marked by any feature of undue severity. Delirium was slight and transitory. He desquamated safely, and there were no renal sequelæ. During convalescence there were rheumatoid pains in the joints and eyeballs, and his pulse was frequently below 70.

On August 12th, 1874, seven months after his recovery from the scarlatina, and when he was in his eighteenth year, he had a fit in the store-room at 6 p.m. He called out for his father, who was not far off, and who, on arriving, found him fallen to the ground, unconscious, convulsed, and frothing at the mouth. When I saw him half an hour afterwards his pulse was 60; the eyes were swollen, and the conjunctivæ much ecchymosed. The rupture of the subconjunctival vessels indicated a violent attack, as do petechiæ of the skin from rupture of the blood-vessels of the corium. It was admitted that he had been over-eating himself lately, and the immediate cause of the attack was set down to a surfeit of not overripe plums to which he had got access in the store-room. It was not found out whether he had not also swallowed some of the plum stones. For several days subsequently the pulse ranged between 56 and 60. For some time before this attack he had been liable to diplopia after reading, and one day exclaimed, "Is there fish for dinner? I see two forks," when there was but one.

He spent the following month (September, 1874) in Wales, apparently in as good health as usual. On Sunday, October 4th, he ate a good deal of salad at dinner. That evening at 10 30, when he was in bed, reading a book before going to sleep, he felt a sensation going from the fingers of his left hand upwards towards his head. Then his head got confused. He called his mother

several times, but only recollected having done so once. When she came to his room she found him in a fit—eyes open and turned upwards, mouth working, face very pale. He soon came to himself without any coma, but trembled afterwards, as if in a rigor, for 15 minutes. I saw him while trembling. Pulse was 80, and temperature 98·7°. Next day his pulse was 60, as usual. Dr. Hudson saw him with me in the afternoon, and it was decided to put him on belladonna, according to Trousseau's method:—

℞. Extracti belladonnæ - - gr. $\frac{1}{6}$
Pulv. fol. „ - - gr. $\frac{1}{6}$
Pro. pil.; mitte 100 similes.

One pill to be taken every morning for the first month, two for the second month, and so on, according to the toleration of the drug and its influence on the disease. His bowels were to be cleared out beforehand with castor-oil and turpentine. This was done.

On Nov. 19th he got a giddiness at luncheon time, and found himself "saying things wrong." Dec. 15th, got a queer sensation in his head at breakfast, and afterwards his arms became cataleptic; shortly afterwards he vomited for some time. He had eaten beefsteak at breakfast. On the evening of Saturday, Jan. 16th, 1875, he had a fit after having eaten a good deal of cream. May 12th, 1875, after an interval of four months, he had a fit immediately after dinner, at which he had eaten rich pudding.

Aug. 9th, 1875, Dr. Hudson saw him again. It was decided to leave off the belladonna, which had been increased up to four pills a day, and to put him on 15-grain doses of brom. potass. ter die with a small quantity of strychnin. His bowels have been most obstinately costive ever since his attack of scarlatina, although they used to be quite regular before. Sept. 10th, 1875, he had an attack at Llandudno when he had almost finished his dinner. He had eaten a quantity of fat mutton. Dulness and hiccough after the fit were rather prolonged. Dec. 13th, 1875, had a fit at dinner; he had just eaten rapidly and heartily of roast mutton. He had a long attack of tremor after it.

Dec. 23rd, 1875, just at midnight when in bed, he had a fit, the

seventh of the *haut mal.* He called out for help sufficiently loud to alarm his parents, who found him convulsed and insensible when they got to his room. A little wine stopped the tremor and chattering of his teeth. Next day his pulse was 56. Dr. Hudson saw him a third time, and it was decided to have him dine early, to take some wine (Carlowitz), and he was ordered arsen. ferri $\frac{1}{12}$ gr.; phosph. zinci., $\frac{1}{4}$ gr.; ext. nuc. vom., $\frac{1}{4}$ gr.; in pill twice a day. His face never got livid during or after a fit, and the most usual introductory symptom is giddiness and confusion of mind. Up to this he had had seven attacks of the fully marked kind.

1.	12th August,	1874,	attributed to	plums.
2.	4th October,	„	„	salad.
3.	16th January,	1875,	„	cream.
4.	12th May,	„	„	chancellor's pudding.
5.	10th September,	„	„	fat mutton.
6.	13th December,	„	„	eating fast and rapidly.
7.	24th „	„	„	no cause assigned.

The 2nd and 7th were taken in bed, four of the others at the dinner table, and one in a store-room. These seven attacks cover two years—1874 and 1875.

Jan. 20th, 1876, when half through his breakfast this morning he had a fit. The warning was longer than usual, but the attack was shorter—the convulsions lasting about a minute. At 2 p.m., the same day he dined on fish, and before he had finished eating he had a severe attack. While recovering from it I saw him. He was shaking violently; in a few minutes he vomited the fish he had been eating. This was the first occasion on which he had vomited after an attack, though he had often been given ipecacuanha wine and warm water to induce him to do so, and without success.

Feb. 5th, 1876, had a slight attack this morning before breakfast. Pulse just after it was 58. His face remained pale, indicating debility of the heart and anæmia of the brain—a constant phenomenon with him. It was thought that the occurrence of so many attacks at or after meal times might be due to digestive processes appropriating his scanty supply of blood, to the deprivation of the due allowance required for the brain.

Feb. 14th, 1876, had an attack at 2 p.m. after dinner. It was followed by vomiting of what proved to be more the porridge he had eaten at breakfast than the food he had just had at his dinner. He had been given a little brandy when he felt the fit coming on. and this attack was not followed by rigor, as had often been the case. April 5th, had a slight attack at dinner time; he was very hungry and was eating fast; was unconscious, but not sick afterwards. Aug. 11th, had an attack, not as severe as usual, immediately after dinner. Sept. 25th, a severe attack during dinner, at which he was noticed to have eaten greedily. Oct. 10th, had marked attack at dinner. There was an interval of what seemed to be five minutes between the time he made his usual exclamation, "I feel sick," and the time convulsions came on. In this interval his father walked him up and down the room, but did not abort the seizure. During the convulsive stage his mouth was wide open and pulled to the right side. This fit occurred at 3 p.m. He was quite well in the evening, and played a game of whist. There were rather rich cutlets at dinner that day, but he had not eaten much of them when he got ill.

Nov. 25th, 1876, he was examined by Dr. Brown-Séquard, who was in Dublin at that time. He considered there was some anæsthesia of the left side of the face, and some diminished power of standing on the left side of the body. He ascertained that the sense of hearing in each ear was very acute, though the boy had almost constant tinnitus in the ears. He thought there was basal irritation in the brain, the result of the early meningitis or of the scarlatina, or connected with both; that some weak point in the stomach was the exciting cause of the manifestations—advised ice to be rubbed for fifteen minutes every second night to the back of his neck and to the interscapular spine, and prescribed his iodide-bromide mixture, ʒss. three times a day, and ʒiiss. at bedtime. About an hour after this examination the patient got his sixteenth attack, while at his dinner, which was of boiled chicken. The warning stage was very long on this occasion. The application of the ice was so painful it was not persevered in; it made the skin as red as if it had been scalded. The iodide-bromide

mixture increased his pallor very much and produced troublesome acne.

March 11th, 1877, at dinner-time, after eating a few mouthfuls, he "got sick" as usual, was laid on the floor, but no convulsions ensued, nor did he completely lose his consciousness. The full development of the attack appeared to be warded off either by the horizontal position or by keeping his attention awake by talking to him, shaking him, and rubbing his hands and feet.

March 30th, had an attack like the previous one, but even milder. He is in such dread of eating that at times he almost starves himself.

A suggestion was now acted on of giving him, just before his dinner, five or ten drops of chloroform in a glass of wine, with the object of lessening the irritability of the gastric mucous membrane. In the middle of April, 1877, he got a sudden febrile attack, which, though it subsided in two or three days, caused some alarm (before it had been judged of by its disappearance), lest it should be of a meningitic nature. He wakened at 2 a.m., with very violent headache, and intolerance of artificial light. He could not stand, his eyes were injected, and he had osteal pains in the legs. Temperature was 102·2°, and pulse 108, which, considering the habitual slowness of his pulse (averaging 60), was for him a considerable increase in rate. There was no reason to regard it as due to iodism. The attack subsided under the hourly use of drop doses of tincture of aconite and some powders of calomel and pulv. Jacobi. Later on in this year (1877) the attacks assumed a milder character, taking more the type of the *petit mal;* thus, 15th July, he had an attack of giddiness after rising, which lasted only a short time; 11th Sept., had a more severe attack in the morning, with convulsions; they did not last long, and he was soon roused; 2nd Oct., a slight attack of giddiness, which soon passed off; 3rd Nov., an attack of giddiness at breakfast, which soon passed off while he was being rubbed smartly. It was found that during this year (1877) the attacks could be abbreviated by tickling, slapping, pinching, walking him up and down, talking loudly to him, giving him snuff, and in any way keeping his attention excited.

In Midsummer of 1878 a seton was put in the back of the neck.

His handwriting had become very unsteady and his face was quite disfigured with acne, which had assumed the shape of dull red tuberosities. The bromide of calcium was substituted for that of potassium, and arsenical solution was added, without modifying the irritation of the skin.

He had attacks in August, September, October, and November of 1878. As the warning was now so long he had recourse to a bottle of nitrite of amyl, which he carried about him or had within reach, but for some reason or other it did not prove effectual. His handwriting improved immensely during the course of this year. The acne eruption resembled a crop of boils. In the year 1879 he had eight attacks—seven of the *petit mal*, one of the *haut mal*. In January, 1880, he had two attacks, both of a severe kind. After this there was a very marked diminution in the frequency and severity of the seizures, which, as is often said in reference to chronic cases, wore gradually away. In this year, 1880, which may be called the final year of the disease, he took nitrate of silver for some time, and also pills of phosphorus and valerianate of zinc, but it was evident the disease had been upon the wane before these remedies had been employed.

In reference to the title which I have given this case, I wish to remark that I have called it gastric epilepsy entirely from a clinical point of view. The first nine attacks occurred at or immediately after meals, and appeared to be connected either with the use of unsuitable articles of diet or with an injudicious method of eating ordinary food. The earlier attacks ensued after eating such things as half-ripe plums, salad, cream, chancellor's pudding, rich mutton. The greater number of the subsequent fits were either during or soon after dinner. The dining-room was the place in which he was generally taken ill. On some occasions vomiting indicated a desire on the part of the stomach to rid itself of something noxious; yet it was found that emetics often failed to unload the stomach. The term Gastric Epilepsy has the sanction of Sir George Paget,[a] who, in a lecture thus headed, delivered at Addenbrooke's Hospital, observes that "in no organ is the

[a] Lancet, 1868. Vol. I., 459.

immediate exciting cause of epileptic fits more frequently found than in the stomach." He reports the case of a hospital patient of his whose head had been injured in early boyhood by the kick of a horse, and who may thus have acquired some predisposition to the disease. No symptom of it, however, appeared until one day, when he was fifteen years old, he ate an enormous number of cherries, including many of the stones. An epileptic fit was the consequence. Several fits followed—at first at intervals of a few months, then of one month, and then more frequently. They were preceded by an aura from the epigastrium to the head. At the age of twenty-four he was found drowned in a shallow ditch, into which he was supposed to have fallen in a fit.

The occurrence of the first fit in my patient within a few months of recovery from scarlatina might suggest the possibility of a uræmic attack, only that it had been ascertained that at the time of its occurrence, and for a long time previous, his kidneys had been acting healthily, and that the urine was perfectly normal. Scarlatina had been frequently noted as a disease precursory to epilepsy. In 19 out of 37 cases collated by Dr. Gowers,[a] in which an acute illness was the apparent cause of the first fit, that illness was scarlatina; and these cases of epilepsy subsequent to scarlatina all commenced during early life—under seventeen.

In another place[b] it is stated by Gowers that more cases of epilepsy are consecutive to scarlatina (apart from the influence of nephritis) than to all the other acute diseases put together. It may appear to some that the case which I have detailed under the name of gastric epilepsy might have been more properly named as a case of epilepsy in one whose gastric arrangements were in a morbid state, and I would not object to such a change of title. It may, I think, be taken as a fair statement of the case to say that probably the early attack of meningitis, and the violent chorea which followed it, so impaired the nutrition of the motor centres as to have left a predisposition to further disturbance under the action of another exciting cause.

[a] Gulstonian Lectures. British Medical Journal. 1880. Vol. I., p. 356.
[b] Diseases of the Nervous System. Vol. II., p. 679.

However, as to the use of the name which I have adopted—that of Gastric Epilepsy—it is a very old notion that many cases of epilepsy were directly connected with gastric irritation; and hence, perhaps, the stress which used be laid upon regimen in the treatment of such cases. We have the *epilepsia stomachica* of Sauvages, Cheyne, &c., and the *epilepsia gastrica* of Frank and others. Cheyne relates the case of a celebrated physician who had suffered from epilepsy for a considerable time, and had used numerous remedies without benefit. As he perceived the attacks occurred less frequently, the fewer and the more digestible the articles of food he consumed, he confined himself entirely to milk. He took a pint of milk in the morning, another in the evening, and two in the middle of the day, taking nothing besides but water. He continued this diet for fourteen years, and entirely recovered from his epileptic attacks—an instance of abstemiousness which, Romberg remarks, is not often to be met with.

The dietary of epileptic patients has been regarded by many as a matter of cardinal importance. Dr. Gowers does not attach so much weight to this matter as do many of the older authorities. In some observations which he made, by keeping a patient under unaltered medical treatment for alternate periods, on a diet with and without animal food, he could observe no difference in the attacks, except that in one patient they were slightly more frequent in the periods when animal food was excluded, and in one patient hystero-epileptic attacks on ordinary diet became, when meat was excluded, severe epileptic fits, and again became hystero-epileptic when animal food was restored.*

The frequency of an epigastric aura as a subjective commencement of a fit may have fixed attention on the stomach as the starting-point, more than would have been the case had visceral auræ in the region of the pneumogastric nerve been less common. In former days the aura was regarded as a change in the nerves of the part to which it was referred, exciting the fit, whereas now it is known to be merely the impression made upon the consciousness by the commencing action in the brain, or by the effect of this on

* British Medical Journal. 1880. Vol. I., p. 549.

the periphery. The fact that an aura commencing in a limb may be arrested by a ligature around the limb, above the part to which the sensation is referred, was once thought to constitute evidence that the process of the convulsion originated at the periphery, and extended thence to the cerebrum. It is now well known that the ligature will arrest a fit which is due to a cerebral tumour as effectually, and more frequently, than one of any other kind.* In the case which I have reported improvement set in after perseverance in Brown-Séquard's mixture. The frequency as well as the violence of the attacks diminished under its continued use. Great personal disfigurement was the result of the large doses of the iodide and bromide of potassium, and the combination of either arsenic or strychnin did not seem to lessen the amount or size of the acne. The patient is now able to discharge the duties of an official post with complete efficiency.

* Gowers. British Medical Journal. 1880. Vol. I., p. 394.

NOTE ON THE RELIEF OF MIGRANOUS HEADACHE.

By JAMES LITTLE, M.D.;
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[Read in the Section of Medicine, April 20, 1888.]

THOUGH the typical form of migraine—consisting of the visual disturbance, hemicrania, and nausea—is not a very common affection, we frequently meet with persons suffering from headaches, which seriously interfere with the occupations and comfort of life, and which appear to me to be of the same nature as the special neuralgia to which the term migraine is applied. These headaches occur at various intervals, sometimes only three or four times in the year, sometimes two or three times in a week. It is usually described as a dull disabling headache, and is first felt on awaking or immediately after getting up. Generally those who suffer from it say that they go to bed the previous night feeling particularly well, but occasionally they have a warning of the approach of the attack on the previous afternoon. Sometimes the headache goes away after breakfast, but far more frequently the sufferer is unable to take breakfast, or finds that whether he can take it or not the headache increases. During the day he has distressing fits of retching, but usually is able to sleep when night comes, and the following morning he awakes merely weak. In a certain proportion of cases the headache is at first limited to one brow; and in these the invalid is less fortunate, for he generally finds that on awaking on the second day the pain has not gone, but has merely crossed over to the previously unaffected side of the head. The diagnosis of the nature of these attacks is very important. Those who suffer from them generally regard them as due to

derangement of the digestive organs, and some of their advisers take the same view, and endeavour to avert the attacks by rigid care in diet, and by medicines which act on the liver and digestive organs. Such measures are, I think, very seldom of advantage, not infrequently rather the reverse; and in speaking of these headaches as being allied to migraine, I mean to convey the idea that they are really neuralgic, and are to be postponed and relieved when they come by treatment directed to the nervous system.

Of the means which are useful in lessening the frequency of these headaches, the most efficacious are, I think, abundant exercise in the open air, a nourishing diet, sponging with hot water in the morning, followed by the cold douche over the shoulders and spine, and a very sparing use of tea; and among drugs the combination which has appeared to me to do most good is a pill containing one-twelfth of a grain of arseniate of sodium, one-sixth of a grain of extract of indian hemp, one-third of a grain of extract of belladonna, and two grains of valerianate of zinc, taken after breakfast and dinner.

Up to October, 1885, I did not know of any treatment which had any distinct power of cutting short the attack when it came, or even mitigating its severity. Most patients found that if they refrained entirely from any attempt to take food, and were able to lie in a darkened room, they did all which was possible to lessen the intensity of their sufferings. Those who had on the previous evening a warning of their impending attack sometimes thought they kept it off by a full dose of bromide taken at bed hour. Others found that a dessertspoonful of the granular citrate of caffein was beneficial, while some told me that lemon juice or vinegar relieved the sickness and headache; but at this time it occurred to me to try salicylate of sodium, and after more than two years' experience of its strikingly beneficial effect, I feel justified in commending it to the members of the Medical Section. I am in the habit of directing the patient, when he awakes with any feeling of headache, to take twenty grains of the salicylate in a wineglassful of water, made effervescent by the addition of a dessertspoonful of the granular citrate of caffein, and if necessary to take a second

or even a third dose at intervals of two hours. The effervescing caffein makes the dose a very palatable one, which the salicylate alone is not, and probably renders it more useful; but that the good effect is not due to the caffein is proved by the fact that I have seen it relieve persons who had previously used the caffein alone without benefit. It does not, as far as I know, lose its effect, as a patient of mine, to whom I gave it more than two years ago, tells me that she finds it as valuable as when she first began its use. One lady informed me that she doubted the advantage of keeping off the attack, as she found that it did come at last, and was then far more severe than ever. This, however, has been in my experience a solitary instance of the storing up of the nerve storm—a phenomenon which has been from time to time observed when epileptic seizures were postponed by the administration of the bromides, and its occasional occurrence does not lessen the propriety of keeping off the headaches when we can.

Case I.—On November 25th, 1885, Miss H., aged thirty, consulted me for attacks of pain in the left eye, and around, and to the outer side of, the eye. The pain was always felt on first awaking, and was accompanied by general headache and by nausea. She had pain in the region of the sigmoid flexure, and very confined bowels, and she had noticed that if she neglected taking aperient medicine the attacks were more severe. She also suffered from coldness of the hands and feet, but was otherwise in good health.

I prescribed the pills to which I have already alluded, an aperient, consisting of equal parts of the liquid extract of cascara and syrup of ginger and the salicylate of sodium and caffein. I never saw the lady again, as she does not live in Ireland; but six months afterwards her mother consulted me, and told me that the salicylate and caffein had proved quite effective for cutting short the attacks.

Case II.—On March 20th, 1886, Mrs. M. consulted me. She had suffered from headaches for about ten years; up to December, 1885, they had occurred about once every three weeks. Since that date, she had had one nearly every week, and they had been much more severe. She slept well; but, on awaking, felt shooting pains in the back of the head and tightness across the forehead, which ended in dull, heavy pain all through the head, often accompanied with feeling of pins

and needles in the right hand. She also suffered from feelings of distension after meals, an unpleasant taste in the mouth, and confined bowels. She had already tried the granular caffein, and had found it sometimes useful. I advised her to dine early and take more exercise, to keep her bowels open by a pill of calomel, aloes, and asafœtida, which had many years before been ordered for her by Sir Dominic Corrigan, to take hydrochloric acid after dinner, and the salicylate and caffein when she awoke with headache.

More than a year afterwards, I heard from her that she had found the salicylate and caffein most effectual in keeping off her attacks.

Case III.—Last summer a married lady, aged fifty-eight, sought my advice on account of headaches, which had begun eight years previously, two years after the cessation of menstruation. At first she had the headache every three or four weeks; but of late the intervals had been only ten or twelve days. The evening preceding the attack she feels drowsy, and during the night often has nightmare. She awakes about five o'clock with throbbing pain in the vertex, and retching almost immediately begins, and continues violently and convulsively during the day, so that she cannot leave her bed—the pain in the vertex continuing all the time. About eight o'clock in the evening her sufferings begin to abate, and next morning she is as well as usual. Much pale urine is passed during the attack; her appetite is always poor; she eats little butcher's meat; and has confined bowels. She suffers almost every night, more or less, from nightmare, and is constitutionally anxious and easily worried. This lady had consulted a London physician, who deservedly has a great reputation for his knowledge of maladies of this nature, without benefit, and had been long under the care of one of the most skilful Dublin physicians, at whose suggestion I saw her. I advised her to take pills of bromide of zinc and Indian hemp twice daily, and to use the salicylate and caffein when the attack began. The pills had no effect in keeping off the attacks; but the salicylate and caffein proved quite effectual in cutting short each attack, and had not lost their power after nine months.

I do not think it necessary to trouble the Section with further details of cases. The combination which it is the object of this paper to commend has, I know, been tried by some of my medical friends to whom I have mentioned it, and I hope others will try it and will find it as generally satisfactory as I have found it.

NOTE ON THE POWER OF SACCHARIN IN PREVENTING AMMONIACAL CHANGE IN URINE IN CHRONIC CYSTITIS.

By JAMES LITTLE, M.D.;
President of the King and Queen's College of Physicians in Ireland;
Physician to the Adelaide Hospital.

[Read in the Section of Medicine, April 20, 1888.]

The management of cases of chronic cystitis has been greatly improved of late years, and as a consequence its power of inducing secondary changes in the kidneys, and so destroying life, has been greatly lessened. Of these improvements I think the first place is due to the manufacture of catheters which can be easily used by the patient himself without risk, by which means the accumulation of residual urine in the bladder is prevented. At the same time, medical men have become impressed with the necessity of urging scrupulous cleanliness in the instruments introduced into the bladder—a precaution which, a few years ago, was certainly neglected. As a consequence of the introduction of catheters which can be passed without pain or violence, I believe much relief has been given, and ammoniacal changes in the urine prevented by washing out the bladder with warm water, or antiseptic solutions; but it has always appeared to me, perhaps because I am a physician and not a surgeon, that it is better, if we can, to keep the urine free from decomposition by medicines given by the mouth, and so reduce instrumental interference to a minimum; and this practice I have always followed, especially in the case of aged persons who have come into my hands, and in whom chronic cystitis constituted part of their sufferings. Unfortunately, such patients have not infrequently irritable stomachs, as well as irritable bladders; and most of the drugs which are useful in

keeping the urine sweet are liable to disagree and cause sickness. This certainly applies to the remedies which were chiefly used a few years ago—quinine, tincture of perchloride of iron, benzoic acid, and benzoate of sodium. Boric acid, which has been more used of late, is not so likely to sicken, and is, I think, best given in lemonade.

For the past three years I have been asked, from time to time, to see a lady, nearly eighty years of age, who is quite confined to bed in consequence of chronic disease of the bladder, which gives rise to frequent and painful calls to pass water. The urine always threw down a copious purulent sediment, and, except when decomposition was prevented by treatment, was always ammoniacal. The lady has many times passed, with great suffering, phosphatic calculi, and, I have no doubt, many such exist in the bladder, but she has always refused to permit any surgical interference beyond the occasional introduction of a soft catheter, and the washing out of the bladder by a lady who acts as her nurse. Quinine and boric acid, when taken in fair doses, always purified the urine; but about three months ago her stomach became so irritable that these drugs could not be borne, and the washing out of the bladder by a weak warm sublimate solution could no longer be practised, as the passage of the catheter had become exquisitely painful. The consequence was that the urine became so offensive that the odour met one on the stairs, and the patient's attendants had often to leave the room to avoid being sick. In this difficulty it occurred to me to try saccharin. I directed six of the tabloids to be used daily. In three or four days the urine was no longer offensive. The patient has continued their use ever since, and the urine has not again become ammoniacal, though there is little, if any, diminution in the quantity of contained pus.

Since the foregoing case came under my observation, I have had four other opportunities of observing the effect of saccharin in patients who were passing ammoniacal urine. They were all males; one a case of catarrh of the bladder, in a paraplegic gentleman; one a case of chronic cystitis, with enlarged prostate; and two cases, in which there had existed stricture of the urethra,

but in which, although a surgeon had successfully dilated the stricture, the urine remained ammoniacal. In all these cases the saccharin was distinctly useful, but in all its administration had been combined with the daily use, by the patient himself, of a catheter, so as to prevent the accumulation of residual urine in the bladder—a precaution without which no drug will, I think, prevent decomposition of the urine.

A RARE FORM OF MENTAL DISEASE (GRÜBELSUCHT).

By CONOLLY NORMAN, M.K.Q.C.P., F.R.C.S.;
Medical Superintendent of the Richmond District Asylum, Dublin.

[Read in the Medical Section, April 20, 1888.]

THE case which I am about to bring before the Section is one of a form of insanity that has been seldom referred to by English authors. Hence, perhaps, it has no recognised designation in English. The term "metaphysical insanity," I am aware, has been used, but this phrase is certainly not happy, and has no more descriptive force than the name "metaphysical poetry," which Johnson applied to the works of Cowley and Donne.

The affection to be dealt with was first described by Griesinger in the year 1868 (*Archiv für Psychiatrie*, I., 3), and was by him termed "grübelsucht," a word for which, I apprehend, it would be difficult to construct in our language an exact equivalent.[a] It has been considered by some French authors to be a form of *folie du doute*, but it decidedly possesses sufficiently well-marked individual characteristics to differentiate it as distinct from the ordinary varieties of that condition.

Its essential feature is the obsession of the mind by an imperative mode of thought, taking the form of perpetual interrogation, a constant urgent morbid impulse to inquire into and investigate everything, an incapacity to accept contentedly the ordinary postulates of knowledge, and finally a total inability to fix the attention upon anything except the spinning of an endless web of meaningless questionings.

It has been noted by most observers, and Griesinger calls parti-

[a] Deriv. *grübeln*, to go about inquiring, to inquire closely, to busy one's self inquiring about subtle questions or trivial matters, to pry.

cular attention to the fact, that the questionings which torment the sufferer are mostly of an entirely unpractical and theoretical nature; but this is not necessarily so, as the following case shows. The form which the interrogations take is no doubt largely dependent upon the patient's former habits of thought and degree of culture, &c.

CASE.—My patient was a woman, thirty-two years of age, who had been married sixteen years. Her husband was a skilled artisan. He was a man of violent temper and somewhat irregular habits. Owing to drink and ill-health he was frequently out of work, and the patient's circumstances were consequently often distressing. She had borne nine children, of whom six survived. The last three children were born within a period of two years and nine months. When she came under my care she was suckling the youngest (then four months old). She had been four and a half months pregnant of this child before she was conscious of the fact, and had been suckling the preceding infant up to that time.

On August 10, 1887, she came to consult me, fearing, as she said, that her mind was giving way. Her history was that she first became ill about nine months before (being at that date about five months pregnant). Illness began with smothering sensations in the early morning. She experienced a dread lest, if she did not get up immediately when she woke, something dreadful would happen—the room would collapse, the ceiling fall upon her, or she would go out of her senses before daylight would come. After these sensations had lasted for a while, what she called "dreadful illusions" appeared—viz., she could not see a straw, or a bit of glass, or a bit of paper lying on the ground or floor that she must not pick it up and examine it so as to be sure what it was. If she saw a bit of printed or written paper on the street she felt that she must look at and examine it, see exactly what it was, know what it referred to, and whether it concerned her or not. So much distress was occasioned in this way that she kept indoors in a room with the blinds down that she might see as few objects of the kind as possible. "One evening walking with my sister in the street I saw two bits of paper in the gutter. I was ashamed to stop then and examine them. I could not sleep all night thinking that I must know what was on them. I awakened one of my little boys, told him where they were, and went down with him to get them, but I shut my eyes going through the street lest I should see

something else. When I got home I found them indifferent things—bits of children's picture books."

About this time her husband brought her to a hospital. At her own earnest request she was conducted through the streets blindfolded.

Her condition varied somewhat from time to time. On the whole, she was better in August, 1887, than she had been before her confinement. After her confinement she consulted an eminent obstetrician, who stated that she had no uterine disease, and prescribed tonics and nourishment, with apparent benefit.

On her first visit to me she described her state as above detailed, and further said that she found herself unfit for domestic work owing to her condition. If she washed the baby or the clothes the smallest particle of dirt must be investigated. She had to look into it, to see what it was—what it *really* was. When she could find out, she was happy for the moment; if she could not find out, her distress increased, and culminated in a nervous paroxysm to be presently described. Similarly with cooking. Extreme distress was occasioned by seeing any small object in the food; had to give up putting thyme in the soup, the small particles caused such trouble. "I asked myself is that a little bit of thyme? It might be something else. That other little bit—is it thyme? I shall never be sure that all these little pieces are thyme. Can there be anything else but thyme in it? What *is* thyme? and so on." If she were to see a bit of thread sticking out of her child's dress, or lying on the floor, she had to catch it up and examine it, and make out exactly what it is. If some one told her about it she threw it away—perhaps began to think of it again, had to examine it again, and so forth. When she took up a newspaper she had a feeling that she could not lay it down till she had read it *all*. Nothing could be omitted. If she laid it down unread, or partly read, she felt, as she expressed it, "I have still the paper to face," and got no rest till the task was finished. In reading, if she tried to fix her attention, say, on the leader, she kept catching sight of advertisements or other matters of indifference, and felt that she must read these. Thus she could not fix her attention consecutively on any one part, which increased her difficulty. A nervous paroxysm thus originating was frequent.

Complained also of a sense of the unreality of things about her. Nothing looked as it used to. This sensation was apt to be brought on by inability to investigate some trifle. It seemed to come upon

her that she could not discover what anything really was, or whether anything was what it seemed.

It will be seen that the objects which served to start her interrogations were usually of a very concrete and definite nature. Sometimes there was a sort of underlying justification, as in her scruples about the cleanliness of the food, &c. Often, however, the sudden call for an act of volition would start the interrogative "illusion," as she called it. Instead of deciding a question put to her, or acting promptly in an emergency, she would begin questioning herself, "Shall I or shall I not? It must be done. What is it? What must I do? What is *doing* anything? God does everything. How can I do anything?" Thoughts like these flash through her mind, and end either in an agonising sense of their futility and illusiveness, or in mere confusion—both states followed or accompanied by a nervous paroxysm.

The nervous paroxysms of which mention has been made came on sometimes spontaneously, and sometimes were excited by the difficulty she experienced in investigating some matter. They also occurred in consequence of any small shock, a sudden message, an angry word from her husband, or the like. They were very apt to arise when she was prevented, either by herself or others, from following up some inquiry she felt impelled to make. She described these paroxysms as beginning with sudden terrible sense of something impending or of something left undone, something wrong, something that wanted to be cleared up, and yet an impossibility of making it right or of knowing what to do. Feeling increased to a sort of climax in a complete sense of confusion, accompanied by a dreadful sensation in the head, which she variously described as "a sense of numbness," "of emptiness," "a drumming stinging pain" in the vertex, "a stupid feeling, with a dreadful buzzing sound in my ears." She thought her head shook at such times, but others did not observe this. She fancied she derived relief from squeezing her head tightly with her hands. She trembled violently all over, and broke into a profuse perspiration when the attack reached its acme.

The appetite was fairly good, unless when she herself prepared her meals. Then her perpetual investigation led to a feeling of loathing for the food that she had made ready.

Usually slept soundly from 11 p.m. till about 4 a.m. Immediately on awaking she began worrying herself over something that she had been examining the day before, or something to be

examined during the day. She suffered most from early morning till noon, improved in the afternoon, and often felt quite well in the evening, and wondered at her state earlier in the day.

She was very thin and pallid; her lips and gums were pale; the tongue large, pale, and flabby; pulse small, quick, and irritable; facial expression haggard, at once languid and anxious. She was perfectly collected and very intelligent. She had a perpetual distressing consciousness of her own condition, and feared the oncome of insanity. "The brain seems paralysed; it seems to have no action except just to dwell on one thing, to hunt after a bit of useless paper and see what is on it, or some such childishness."

Ordered (1) to immediately desist from suckling; (2) to refrain for some time from sexual intercourse, wherein there was some reason to believe there had been excess; (3) to take abundance of nourishing food, and one bottle of stout per diem and no more; (4) tinct. ferri perchlor. M. 15 ter die in infus. calumbæ.

It should be mentioned, by the way, that the patient had been always temperate. Of this I satisfied myself, not merely from her own account, but from the statements of her husband and other relatives.

Aug. 23.—Has visited me now four times. There is a distinct improvement. Less nervous and more confident in manner. Appetite good and improving. States that she is still "excited and nervous," but has decidedly more control over her "illusions." "I baffle them off to a great degree; you told me I could, and I find I can." She returns to this statement, and the assurance of her curability seems to give her resolution. She is depressed and anxious in early morning, when trifling worries and customary troubles, especially incidents of the previous day, occur to her mind.

Complains of a tendency to involuntary closure of the right hand. This she can perfectly control, but she constantly finds her hand tightly clenched; notices the pain of her nails pressing on the palm; opens her hand; forgets about it, and presently finds it again tightly closed.

Perchloride of iron changed to ammonio-citrate, 5 grains ter die.

During the month of September and the early part of October, 1887, while I was away on my holidays, my friend, Dr. Thornley Stoker, kindly took charge of this patient for me. He noted a marked improvement in general health; mentally a good deal of variability, but, on the whole, decided improvement.

Oct. 18.—"Better, much better," "but dreadful nervous," "not collected at all."

Sleep.—Goes to bed between 10 and 11; falls asleep directly; generally sleeps pretty well till about 4, badly till 6. Sometimes awakes suddenly as if from a nightmare; cannot recollect what the dream was, and is anxious, sorry, and distracted till she can recollect. When the carts pass in the morning she feels she must know what they are. She has a feeling of being sorry—a vague feeling that she would lose something by not knowing—a yearning to know what the cart is; asks her husband, "Do you think is that a scavenger's cart?" He says "Yes." "What sort?" "A square one." Then she can doze asleep again, but if he says he does not know, then she feels as if she must follow and find out; that she would lose something if she did not find out; and so on.

Domestic work.—Used to be a "hearty rough woman, brisk in my work, and easy to please;" "can do nothing right now." If I take up a cloth to wipe the table or the floor when it is damp I say to myself, "What is that wet?" and I cannot go until I find out. If I knock a crumb off the table I cannot go on till I find out exactly what it is; feel as if I could go under the fender—under the grate to get it and see it. If I struggle against these feelings they grow stronger; a sense of confusion comes on. I tremble all over, burst out in perspiration, have an indescribable feeling of agitation and *stupor*" (her own word often repeated). In consequence of these feelings she makes no attempt to cook dinner on week days. She dare not put parsley in the soup; if a morsel of it were greener or browner than the rest it must be investigated; if a piece of dirt were on an onion, or a bit of it were discoloured, the same feelings arose. Similarly with the meat; something—a morsel of fat or bone—will catch her eye, perhaps as she puts the meat down; she must thereupon take the meat up again to see what the thing is—even then she gets so uncertain that she has often to call one of the children to tell her what the strange object is. Thus with fumbling and investigating so much time is lost, that on Sundays (when she always tries to make the dinner herself) dinner is often as late as 5 o'clock instead of 2 o'clock!

Attempts to struggle with the feeling bring on usually a nervous crisis, though sometimes she "baffles the thing off." A rebuke, especially from one of the children, will often make matters right for the occasion. With regard to food there is distinctly a dread of taking, herself, or more especially of giving to her children,

anything that she has not investigated. This occurs when the food is being prepared, and also when it comes to table, if she has herself prepared it.

"Since before the last baby was born nothing looked as it used to." Things looked strange; they looked changed; they filled her with an odd sense of doubt. Together with this sense of doubt came the desire to investigate. If she walked in the street nothing looked as it used to. Then if she stopped to look into, say, a shop window, so as to persuade herself things were as before, it called up the feelings that things must be looked into; she must see the other side of a cap hanging up in a milliner's shop; must see if that is a piece of sawdust sticking to a ham in a grocery; must look into the meat hanging in the butcher's shop to see if it is properly cut up.

Ordered to continue iron mixture; to have 15 grains of urethane horâ somni.

Nov. 21.—Considerable general improvement. She is gaining flesh and colour, and feels stronger. Mentally she is more cheerful and self-controlled. A little thing, however, upsets her. When her husband drinks she becomes depressed and uneasy, and all her old troubles tend to return.

December 29.—"A great deal better." She is little disturbed now in the early mornings; more towards noon. Disturbance that occurs is a sudden questioning of herself, "Am I doing what is right? Have I not forgotten something?" and so forth. So she gets anxious, rushes from one thing to another, tries to do several things at the same time, gets distressed and confused, and can do nothing for awhile till she collects herself.

Ordered iron in increasing quantities; urethane, 5 grs. in early morning, 5 grs. at midday, and 15 grs. at bedtime.

January 10, 1888.—Physically, in fair health and condition; mentally, better than she has been since her illness began. She was able to-day, for the first time, to walk from her own home without the slightest disturbance, or without having to look a second time at anything, or worry over anything which she saw.

From the last-named date she continued to improve pretty steadily. She ceased to take urethane at the end of January, and experienced no disagreeable effects from its discontinuance.

Towards the end of February she had a good deal to trouble her. Her baby died of convulsions. At the time her husband was absent from home looking for work, and she was wretchedly

circumstanced. She became depressed, and complained of loss of memory, failure to recollect the trifling occurrences of every-day life, and inability to fix the attention. She dreaded the return of her former "illusions," as she calls them. Nevertheless, they did not appear, and after a time recovery continued quite without interruption.

She has now been for a considerable period apparently perfectly restored to health.

With respect to treatment, I do not regard the narcotic as of much importance. It was chiefly used to gain time for other agencies to have their effect. The avoidance of debilitating influences was the matter of the greatest consequence. Next in importance came nourishment and the exhibition of iron. I cannot help thinking that the moral influence of someone talking to her over her sufferings, and of the assurance that she could to a large degree control herself and that she would make a good recovery, was very beneficial.

There are many points of interest in this case. I have given the symptoms with considerable minuteness of detail on account of their rarity, and because I have not been able to find in the literature of the subject any case representing so complete a picture of the condition as that which I have been able to sketch here, to a large degree in the patient's own words. The integrity of the intellectual faculties, using that phrase in the limited sense, is a sufficient guarantee of the patient's trustworthiness. In all particulars capable of verification by the evidence of others, I found that her statements were fully borne out by her friends.

With reference to etiology, the illness first appeared during pregnancy. The same is recorded in one of Griesinger's three cases. Meschede, who has given a careful description of this condition under the name of phrenolepsia erotomatica (*Zeitschrift f. Psych.*, XXVIII.), narrates two cases. In one the disease came on during pregnancy. In Griesinger's and Meschede's remaining cases, and in the case given by Schüle in his second edition of his "Handbuch," there was a history of either onanism or extreme sexual excess. It is well known that imperative conceptions and the *maladie du doute* are very frequently associated with sexual

depravity, or in women with pregnancy. But I believe that there were several causes in action in the case before us—debility produced by frequent childbearing and excessive lactation, together with mental worry and distress, prepared the way. Perhaps some, so to speak, specific effect of pregnancy determined the form which the illness took, and after delivery the disease was kept up by lactation (excessive in relation to her weakened state), and possibly by sexual excess.

Krafft-Ebing believes that this condition is found almost exclusively among the predisposed. In my case I made most careful inquiries for hereditary neurotic taint, but could find no trace of it. The woman had suffered from no nervous diseases previously, and had enjoyed very good health up to the oncome of this illness.

It is to be noted that these cases are hardly ever to be found in public asylums. They usually occur among the class of private patients. The three cases described by Griesinger were individuals of education and high social position. Berger's patient (*Archiv für Psychiatrie*, VII., 2) was a law student. Dr. Schüle, whose wide experience extends over twenty-five years of work, told me that he has never seen a case except among private patients. Meschede's cases occurred in a public asylum, but one gathers from his description that both patients were persons of good education. My patient was educated far above the average of her class, and was a woman of bright intelligence, capable of giving an excellent description of her condition.

Among the very few cases that are on record I have not been able to find anything resembling the nervous paroxysms that I have mentioned accompanied by pain in the head, &c., save in Berger's case. In it the attacks were more or less paroxysmal, and were accompanied by sudden flushing, precordial anxiety, twitching of the facial muscles, and occasionally a sudden bending of the head upon the chest.

It would take up too much time to discuss all the interesting analogies and connections of this form of mental disturbance. The condition in a feverish dream, the commoner forms of imperative conceptions, and some cases of neurasthenia and *folie du doute*

immediately suggest themselves. Krafft-Ebing, who describes the state under review as one of the formal disturbances of the imaginative faculties—a disturbance in the mode of association—points out its close connection with imperative conceptions (*Lehrbuch der Psych.* 3 Aufl.). Schüle, regarding it as a form of imperative conception, classifies it in his new scheme under the same head as *maladie du doute et du toucher* (*Klinische Psychiatrie*, 3 Aufl.). The general analogies of grübelsucht would undoubtedly lead one to class it, as both the last-named authors do, among the mental degenerations, and regard the prognosis as unfavourable; yet this particular case tends to confirm Spitzka's remark that it is a very curable form of insanity.

NOTES OF A CASE OF FOREIGN BODY IN THE AIR-PASSAGES, WITH REMARKS ON SAME.

By PAUL DILLON, L.R.C.S.;
Demonstrator of Anatomy, Catholic University.

[Read in the Section of Medicine, May 18, 1888.]

The notes of this case, together with the few remarks I have to make thereon, would long since have been brought before the Academy were it not for a circumstance which you and I equally deplore—the death of Dr. Henry Kennedy, who had charge of the case for nearly six weeks in the Whitworth Hospital, Drumcondra, previously to my being called on to treat it. His death has deprived me of the notes of the case at an early and important stage, and would have induced me to abandon the idea of bringing it forward, were I not assured by those better able to judge than I am, that the case is of an interesting nature.

The history of it is as follows:—

Case.—Anne J——, domestic servant, aged forty years, while partaking of some soup on Easter Sunday, 1886, found it too hot to be freely eaten, and began to sip it, making a gurgling noise while so doing; suddenly she "caught her breath," as she expresses it, felt a choking sensation, and became greatly alarmed. She did not, however, feel anything hurt her, and had no idea of any solid body having entered her air-passages. That evening she felt very cold and chilly. On the following Tuesday, April 27th, her breathing became suddenly short and laboured, and continued so for four days. She had severe and constant cough, and on two or three occasions spat small quantities of blood. Linseed poultices were applied to her chest, and some medicines ordered for her by her medical attendant. After the application of the poultices she felt somewhat relieved; still the cough and expectoration continued. Finding that, after more than a month's treatment, she was not

getting well, she changed her medical adviser, and sought the aid of Dr. Kennedy, who admitted her into the Whitworth Hospital on June the 22nd, where she remained under his care till August the 1st, when she left. After this she continued to take the medicine ordered for her by Dr. Kennedy until September 8th, when, not finding herself getting anything better, she again changed her doctor and came under my care.

On examination I noticed she was considerably wasted, and very pale. She was suffering from intense general bronchitis, sibilant râles were everywhere to be heard, together with very strange respiratory sounds, such as I never before heard nor saw described. They were sometimes snoring, sometimes gurgling, irregular in time, sucking, giving the idea occasionally of air having suddenly found entrance through a constricted passage into a large cavity. The condition was precisely the same on both sides of the chest. There was no evidence of cavities in the lungs, no dulness on percussion, no increased vocal fremitus; perspiration was not more marked at night than during the day; her temperature was 99·4°, pulse 90. She had severe follicular pharyngitis, but no aphonia, nor even appreciable hoarseness; had no difficulty in swallowing at any time. Menstruation, which was regular up to July, has not since taken place. Thinking the case, which puzzled me very much, to be one of chronic bronchitis, with accompanying dilatation of the bronchial tubes, I prescribed the following mixture:—

℞. Tr. benzoini co., ℥ss.
Spt. ammoniæ arom., mlxxx.
Vin. ipecac., ʒiii.
Mist. ammoniaci, ℥iss.
Mucilaginis, ℥ss.
Infusi. senegæ ad., ℥viii.
A tablespoonful every 3rd hour.

I applied to her pharynx a 20-grain to the ounce solution of chloride of zinc, and ordered one of Cooper's effervescent chlorate of potash lozenges to be taken three times a day.

The medicine, which she continued to take till the end of September, although it relieved the cough and lessened the expectoration, which was often slightly streaked with blood, did not seem to be really curing the bronchitis. I now resolved to give over expectorants and see what iron and strychnine would do for her. I prescribed the following mixture:—

℞. Tr. ferri perchlorid., ʒss.
Liq. strychninæ, m. lxxx.
Infusi calumbæ ad., ℥viii.
St. ʒss., 3 tiis horis.

Liniment of iodine to be painted over chest every 4th night.

The result of this treatment was most gratifying; the patient began rapidly to gain strength, improved in spirits, her breathing became better, and her cough less. I now looked out for complete restoration to health; but on October 4th, while examining her, I noticed she had a goitre which I had not observed before. I asked the patient how long she had it, and she informed me she never noticed it at all. I continued to see her every third or fourth day for some time, and each time she presented herself I fancied I could notice an increase of size in the gland. I at last determined to treat the goitre, and while making an examination of it on October the 20th, I pressed rather hardly on the gland with my forefinger and thumb, and brought on such a fit of coughing that I thought the patient would die of suffocation in my study. Happily for me, however, she did not, and in a short time felt able to walk home. That night she got another attack of suffocating cough, which ended in the expulsion of this piece of bone, which was six months in her air-passage, and which I now have the pleasure of handing round to the members of the Academy. It measures 24 millimetres in its longest diameter, 11 mm. in its greatest transverse diameter, and is only 3 mm. thick.

Exact outline of bone.

After the expulsion of the bone the patient rapidly recovered, her cough disappeared completely, and on November 18th menstruation occurred, having been suppressed for four months.

I must add that all the history I got of the case when the patient consulted me, and up to the date of the expulsion of the bone, was that on Easter Sunday the patient caught cold, got a great cough, felt depressed in spirits, she did not know why; that she spat some blood on a couple of occasions, and that she was treated by two medical men, as I have before described. I had no history

of this sudden fit of coughing while eating soup, nothing to point to a foreign body having entered the air-passage. It was only when she expelled the bone she remembered the occurrence, and related the details to me as I have described them.

This case is remarkable in several points:—

1st. For the ease with which such a large sharp-pointed piece of bone entered the air-passage, the patient not even feeling it do so.

2nd. For the length of time (six months) it was lodged in the air-passage without producing destructive changes in the lungs.

3rd. For the development of goitre in connection with it.

4th. For the manner in which the body was dislodged and finally expelled.

And lastly. For the almost complete subsidence of the goitre in the expulsion of the bone.

Now, the question naturally arises—Where was the bone lodged? That it was in the air-passage admits, I think, of no doubt. Was it in the lung, occupying one of the bronchial tubes or their primary divisions? I think it was, in the commencement, for, having made a series of trials with the bone on the dead subject, I found that, dropped vertically through the glottis, which was the only way it could enter, the bone passed freely into the eparterial branch of the right bronchus, but got impacted in the primary divisions of the bronchi. That it remained but a short time in the lower part of the air tube is, I think, certain from the symptoms exhibited by the patient, and the auscultatory sounds, for these so fixed my attention that I think I do not exaggerate when I say that I often spent fifteen minutes listening to them and trying to satisfy myself as to their cause. Still I never noticed any difference in the two sides of the chest. The development of the goitre seems to me to be a guide to the position of the foreign body while in the air-passage, and with a view to a solution of the question I made a series of seven dissections of the thyroid region, mainly in connection with the nervous supply of the thyroid gland, and the connection, if any, between this nerve supply and the interior of the larynx—my reason for making the dissections being,

that the nerve-supply of the thyroid gland is very ambiguously given in the text-books of anatomy. Quain dismisses it with the statement that it is supplied by the sympathetic, and puts in small print the statement that some anatomists describe branches of the external laryngeal nerve as being distributed to it.

Gray says the pneumogastric nerve supplies it, but puts a foot-note stating that Frey denies this.

Landois, speaking of the distribution of the pneumogastric nerve, says that the external laryngeal nerve supplies sensory branches to the lower lateral portion of the laryngeal mucous membrane, and, if I mistake not, that it also supplies the thyroid gland. I found the gland supplied, in five of the seven cases, by the external laryngeal nerve; in two cases by the external and inferior laryngeal, which communicated with one another. Bearing in mind, then, that the gland is supplied by the external laryngeal nerve as given in the text-books, and found in five out of seven cases by myself, and also that, according to Landois, the lower lateral portion of the laryngeal mucous membrane is supplied by sensory fibres from the same nerve, I think I am justified in concluding that the goitre was produced by the irritation of the bone lodged in the lower portion of the larynx. This view with regard to the position of the bone would receive corroboration from the sudden and terrible fit of coughing which I brought on by manipulation of the gland, and which ended in the expulsion of the bone.

The bone is too large to be lodged in the ventricle of the larynx, and could never have been tolerated in that position by the patient. Looking over the recorded cases of foreign bodies in the air-passages, I find only one which is very much like this. It was published by Dr. Pollock in the *Lancet* for 1876. The foreign body, which was the vertebra of a rabbit, was lodged for eighteen months in the air-passage of a woman, giving rise to all the symptoms of phthisis. The bone was taken in while the patient was eating soup, and, like mine, expelled without surgical interference; the patient completely recovered.

THE FEVER OF OVER-EXERTION.

By J. F. KNOTT, M.B.;
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[Read in the Medical Section, November 18, 1887.]

An attempt made at the present date to concentrate, even for a short time, the attention of the professional public on an unrecognised, or but partially-recognised, form of disease, should perhaps be prefaced by a sufficient apology. To the still unlicensed student of medicine I offer my cordial and apologetic sympathy, conscious, as I am, of the strain upon his memory produced by enforced familiarity with an already overstocked literature. In my turn, I ask for some sympathetic consideration on the part of the qualified students of the healing art, who are now about to become my critics.

The late Dr. Murchison, in his classical work on "The Continued Fevers of Great Britain," describes the non-specific form included by him in this category (*synochus simplex* of Riverius, or *febris continua simplex* of Lieutaud) as "a sporadic, non-contagious disease, arising from exposure to the sun, fatigue, surfeit, inebriety, &c." The typical symptoms of the febrile state are present, but no specific lesion is discoverable. But a few paragraphs of the goodly-sized volume are devoted to a consideration of the condition. The author refers in a few brief words to a severe tropical form; the native variety he seems to regard as a comparatively trivial complaint, although he hints that it may be sometimes fatal. He does not, however, indicate how the fatal tendency may be manifested. Disregarding the tropical form of the disease, however, I now proceed to inquire into the nature of the unfavourable course which a variety of what may perhaps be still regarded as simple continued fever sometimes takes at home.

Agricultural labourers and the holders of very small farms in

the "congested districts" of the west and south of Ireland often make great physical exertions during some weeks in the spring and harvesting seasons. At other periods of the year their efforts are less continuous; they usually "take the world easy." When the time for hard work comes they are consequently in very bad training, partly from insufficient exercise, partly from insufficient or ill-chosen diet. The uncertain character of our climate necessitates immediate readiness on the part of those concerned to take advantage of a fair hour, and the wisdom of the homely proverb, "make hay while the sun shines" receives more frequent practical illustration in those places than in most other parts of the world. Accordingly, violent muscular exertion is often performed for several successive days, and this is frequently followed by a chill from careless exposure. With (or without) the latter factor, the exertion referred to is not infrequently followed, especially in the hotter months, by marked febrile symptoms. The patient's temperature runs up rapidly, even to 103° F. or 104° F. within a few hours, and this change is accompanied by the general symptoms of malaise, congested face, thirst, loss of appetite, &c. He sometimes takes a day or two of rest, when, feeling a little better, and being extremely anxious to finish his farm labours, he makes a desperate effort to go back to work, although still suffering from the same symptoms in a slighter degree. His efforts are now necessarily less vigorous, but he does enough to feed the slow fire of febrile combustion which has been already kindled in his muscles. The temperature maintains a standard of about 101° or so; pulse is permanently quickened; thirst, constipation, loss of appetite, and loaded urine continue. In such cases, when the pernicious attempts at manual exertion are continued for a number of days, the unhappy individual afterwards fails to recover. Gradual wasting goes on; the pulse maintains its frequency and becomes weaker, the strength by degrees fails, the patient is obliged to take permanently to bed, the fever tends, after some months, to assume a hectic type. If the lungs have any hereditary weakness, phthisical symptoms may appear, but hardly otherwise. Such is the usual progress of the case I attempt to depict. Beginning, as it oftenest

does, in the hot exertion of the warm days of harvesting, the patient spends the following winter months in bed; with the freshness of the succeeding spring, when nature is putting on all her revivifying powers, he makes a feeble attempt to rally; hopes for returning strength, which, however, fails to come. With the heat of summer he again droops; emaciation progresses; a hectic flush appears on the cheeks, and he sinks as the winter cold approaches. All the wise women in the neighbourhood tell you that he will "go with the fall of the leaf," and they are rarely mistaken. Such cases are well known in the country districts to which I have referred. I have a vivid recollection of a farm labourer who worked with me when I lived in the country, and who fell a victim to this train of symptoms. When I did duty a couple of years ago, during a short time, for a dispensary doctor with a large country district, I took full notes of three cases with such a history. The wise women, whose authority I have already quoted, tell you of such a case that has got "the plurrisy." But no pleural symptoms, as medical men understand them, are traceable. When staying for a few weeks in the country last autumn, I saw other similar cases. The three cases to which I have just referred all sank with the fall of the leaf—two in October and one in November. One had survived two years from the initial symptoms; each of the others lived through but one winter.

Such cases are not so often seen in town as in the country, and this fact I am disposed to attribute to the more uniform rate of work which is maintained by the urban artisan. Still they sometimes do appear, and are then, I think, either misunderstood or (comparatively) neglected. If not greatly mistaken, I have seen such a case exhibited to a class of medical students as a specimen of "that rare new disease, pernicious progressive anæmia."

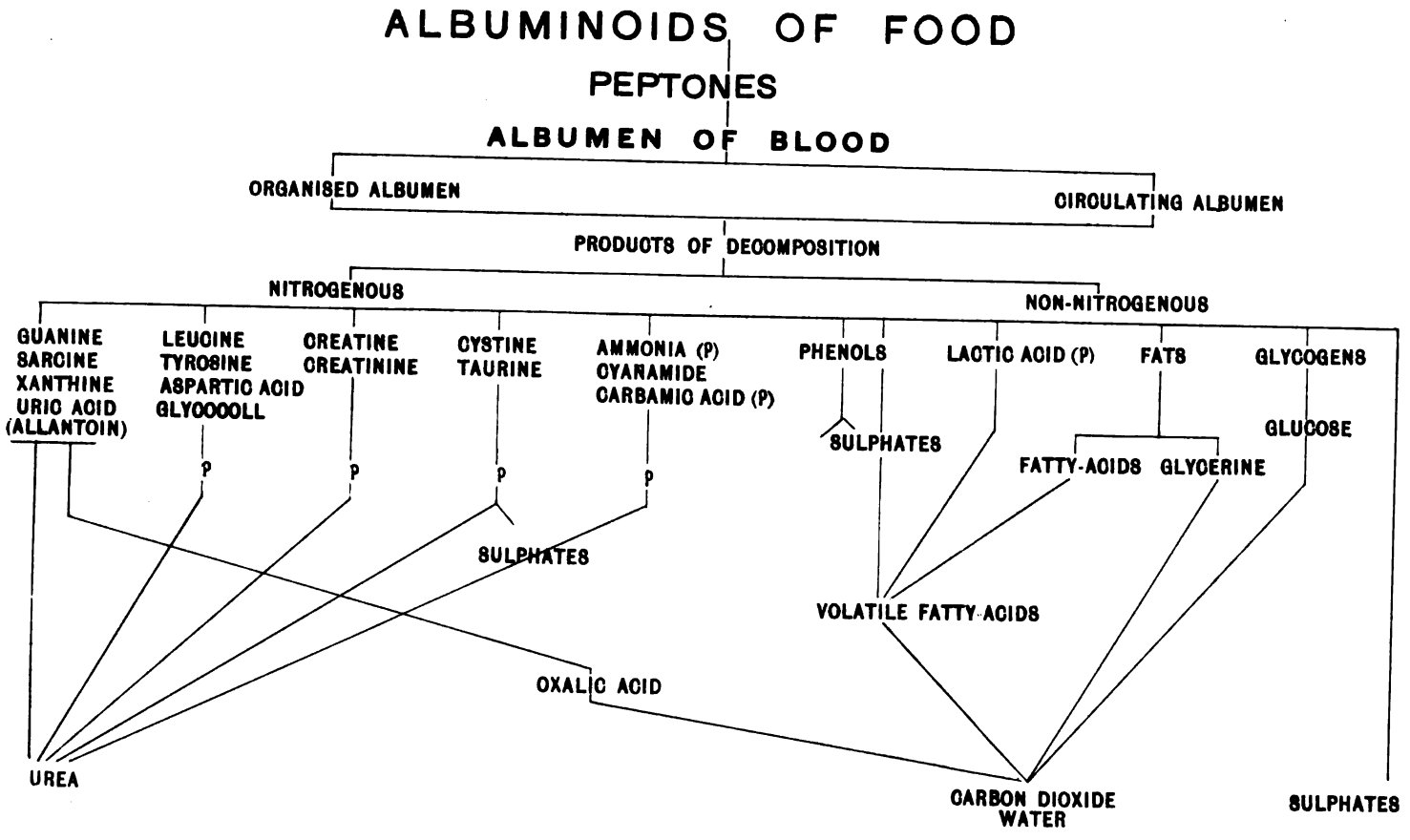
The continued physical over-exertion, which is the starting-point of the phenomena with which we are now concerned, has necessarily the effect of throwing into the circulation a greatly disproportionate quantity of the products of muscular waste. These undoubtedly act, in the first instance, as stimulants to the vaso-motor centres, general and local. But the continued applica-

tion of an increasing quantity of the stimulant must soon be followed by exhaustion. Stimulation of vaso-motor centres or nerves, when already partially exhausted, is followed, not by constriction of the vessels of the corresponding area, but by dilatation, which increases with increased strength of the stimulus, till a condition of complete relaxation is attained. Such, as I take it, is the history of the vaso-motor phenomena connected with excessive muscular exertion.

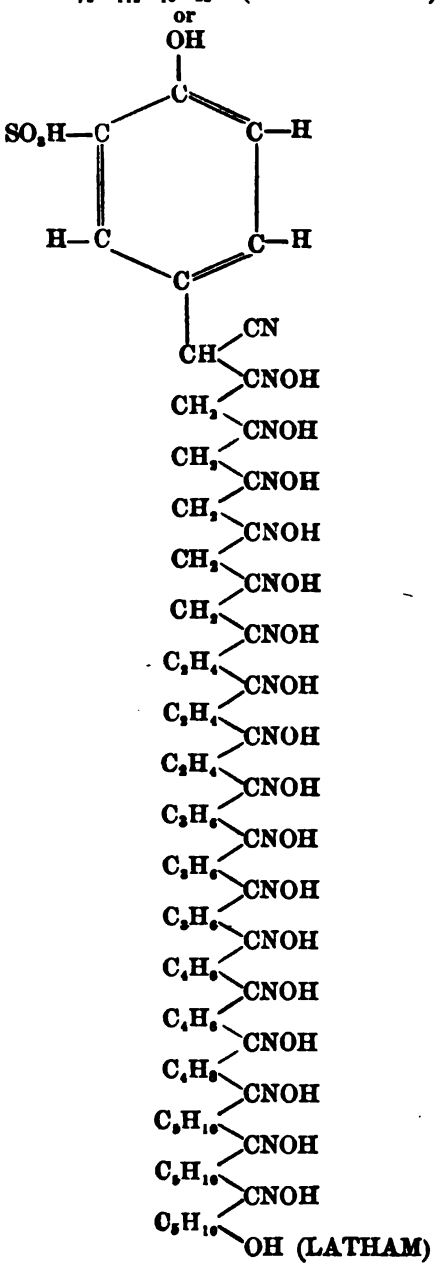
The vascular changes which initiate the symptoms of gout and rheumatism have recently been traced by Dr. Latham, with admirable ingenuity and clearness, to the action of uric acid on the vaso-motor system. The uric acid, set free by excessive or perverted tissue-change, acts, in the first instance, as a stimulant; afterwards paralysing completely the vaso-motor centres, when it has exhausted all the available power of the latter. I would gladly add my arguments to those of so distinguished an authority, and hope, as I proceed, to establish important indications of parallelism between some of the principal phenomena of the fever of over-exertion and those of the well-known fevers just named, and which are usually associated with pronounced arthritic change.

When I sat at the feet of our President, to receive my first lessons in the theory of medicine, I learned an interesting fact, which happened to be soon afterwards emphatically impressed on my memory by an experience occurring in my own person. I have often wondered that greater prominence has not been given it by the writers of our text-books. I allude to the supervention of the symptoms of subacute rheumatism upon those of ordinary simple-continued fever, when the latter has been neglected or injudiciously treated. I hope, before the conclusion of the present paper, to be able to offer an intelligible explanation of the intimate connection between these two, apparently, very dissimilar conditions.

With the view of throwing some light on these clinico-pathological facts, let us now inquire, as closely as we can, into the nature of the products of muscular waste. To facilitate the inquiry, I have placed on the diagram the empirical formula for albumin deduced by Lieberkühn, and following it is the structural formula which has been elaborated by Dr. Latham.


ALBUMINOIDS OF FOOD
PEPTONES
ALBUMEN OF BLOOD
ORGANISED ALBUMEN
CIRCULATING ALBUMEN
PRODUCTS OF DECOMPOSITION
NITROGENOUS
NON-NITROGENOUS
GUANINE
SARCINE
XANTHINE
URIC ACID
(ALLANTOIN)
LEUCINE
TYROSINE
ASPARTIC ACID
GLYCOCOLL
CREATINE
CREATININE
CYSTINE
TAURINE
AMMONIA (P)
CYANAMIDE
CARBAMIC ACID (P)
PHENOLS
LACTIC ACID (P)
FATS
GLYCOGENS
GLUCOSE
SULPHATES
FATTY-ACIDS
GLYCERINE
P
P
P
P
SULPHATES
VOLATILE FATTY ACIDS
OXALIC ACID
UREA
CARBON DIOXIDE
WATER
SULPHATES

ALBUMEN = $C_{73}H_{112}F_{10}O_{22}S$ (LIEBERKUHN)



F

The benzene nucleus which forms so prominent a feature in the latter, is well known to display the most tenacious resistance to chemical change. The albuminoid molecule, as a whole, is notably unstable, and the nature of the connection of the long chain of cyan-alcohol groups, offers an easy explanation of this fact. The detachment and mutual separation of the links of this long chain of molecular groups is necessarily accompanied by the evolution of a quantity of heat; and from the nature of such a molecular large structure, as well as from the large proportion of the total mass of the tissues of the body formed by the muscular system, we can at once understand the very important part played by the latter in producing the heat of the animal economy.

In another diagram I have arranged, in schematic form, the probable succession of the principal products of proteid waste, beginning with their ingestion as albuminoids of food, and ending with their elimination from the system as effete matter.

We have now an explanation of the presence of an excess of uric acid during the rapid and disorderly muscular metabolism of the febrile state.

FATE OF THE DETACHED *CYAN-ALCOHOL GROUPS.*

$$C_nH_{2n}\begin{matrix}OH\\CN\end{matrix} + 2H_2O = C_nH_{2n}\begin{matrix}OH\\CO.OH\end{matrix} + NH_3$$

Corresponding acid of Acetic Series.

$$C_nH_{2n}\begin{matrix}OH\\COOH\end{matrix} + O_2 = C_{n-1}H_{2n-1}.COOH + CO_2 + H_2O.$$

Ethedene cyan-alcohol. Lactic acid.

$$C_2H_4\begin{matrix}OH\\CN\end{matrix} + 2H_2O = C_2H_4\begin{matrix}OH\\COOH\end{matrix} + NH_3$$ [? RHEUMATISM].

Lactic acid. Acetic acid. Formic acid.

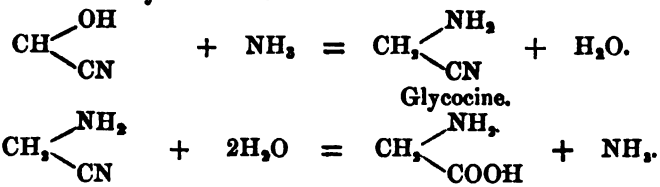
$$CH_3.CH\begin{matrix}OH\\CO.OH\end{matrix} + O = CH_3—COOH + H.COOH.$$

$$=$$

$$CH_3.COOH + 4O = 2H_2O + 2CO_2$$

$$H.COOH + O = H_2O + CO_2$$

Methene cyan-alcohol.

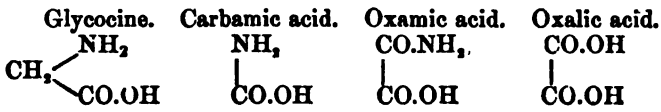


FATE OF *GLYCOCINE* IN THE HUMAN ECONOMY.

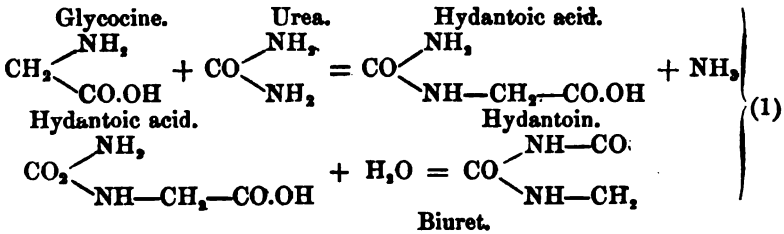
(A.) THE WAY IN WHICH IT *SHOULD* GO.

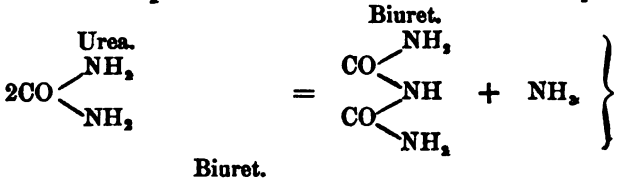
—— Through the kidney as urea.

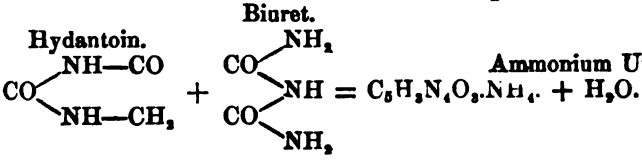
Products of oxidation of—



(B.) THE WAY IN WHICH IT SHOULD *NOT* GO.







By the chemical changes here indicated we have glycocine, formed from the methene cyan-alcohol groups, detached by the disintegration of the albuminoid molecules. This body, by conjugating with urea, forms hydantoic acid, ammonia being

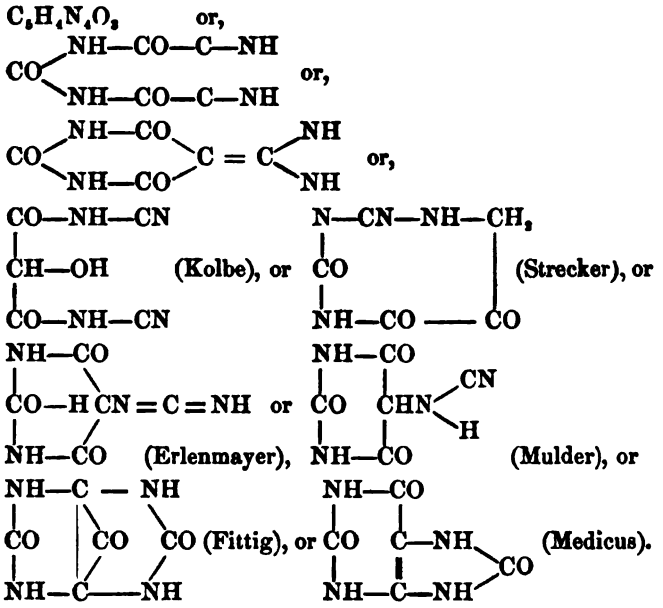
at the same time separated. Biuret is formed by condensation of urea molecules, as here represented—a process which is also accompanied by the elimination of ammonia. Hydantoic acid, by the simple process of hydration, becomes hydantoin, and the latter, uniting with biuret, produces ammonium urate. As the latter compound possesses but slight solubility, a portion is likely to be retained in the circulation. Here it meets with sodium in abundance, especially in the form of sodium chloride, and the stronger chemical affinities of the alkali element easily suffice to displace the ammonium from its position in the molecule. The ensuing double decomposition results in the formation of sodium urate. The existence of the latter in quantity must produce vaso-motor disturbances, even from the beginning; when its presence is prolonged for any considerable period, we can easily understand how this difficultly-soluble salt is crystallised out from the vital fluid in those positions where the movements of the latter are most sluggish. This is exactly in the central areas of the articular cartilages, and thus we have established the well-known physical changes of gout. In order, however, to the manifestation of such local phenomena, a special predisposition or so-called arthritic diathesis appears to be essential; in other cases—including the group which forms the subject of the present communication—we have excess of uric acid in the circulation, leading to various forms of constitutional derangement, but not to local deposit. On the interesting question of the relationship between gout and rheumatism, I will venture to quote my own words from a communication made some months ago to the Medical Section of the Dublin meeting of the British Medical Association:—

"The relationship between gout and rheumatism is, to my mind, satisfactorily explained by the action of uric acid (or, indeed, other exhausting stimulant continuously applied for some time) on the vaso-motor nerve-centre. In the former disease, we have its stimulating effects, leading, in the first instance, to arterial contraction and constructive metabolism; and these phenomena are followed (when exhaustion of the centres supervenes) by dilatation and destructive metabolism. In the latter affection, we have only

the results due to the stimulating of uric acid on an already exhausted centre. In gout the primary area of disordered nutrition is in the liver, in rheumatism it is situated in the muscles. The lactic acid which is necessarily produced in increased quantity from the increased muscular metabolism has further secondary effects, especially on the cutaneous area."

The presence of a special diathesis appears to be necessary for the manifestation of the characteristic local lesion in each of these diseases. The existence of the fever in either case, as well as in that of the fever of over-exertion (with which we are now more especially concerned), can be fully explained by the action on the nerve-centres of the impurities derived from the *debris* of muscle tissue.

URIC ACID—



The interesting constitutional relations between uric acid and some of its congeners are indicated in the formulæ arranged on the following page.

Xanthine.

```
NH—CH
|    ‖
CO   C—NH
|    |   |  \
NH—C=N      CO
```

Hypoxanthine.

```
NH—CH
|    ‖
CO   C—NH
|    |   |  \
NH—C = N      C
```

Guanine.

```
NH——CH
|    ‖
CO   C—NH
|    |   |  \
NH——C = N      C.NH
```

Theobromine.

```
CH₃.N—CH
|    ‖
CO   C—N.CH₃
|    |   |  \
NH — C=N      CO
```

Caffeine.

```
CH₃.N—CH
|    ‖
CO   C—N.CH₃
|    |   |  \
CH₃.N—C=N      CO.
```

Oxycaffeine.

```
CH₃.N—C.OH
|    ‖
C.OC—N.CH₃
|    |   |  \
CH₃.N—C=N      CO
```

Diethohydroxy caffeine.

```
CH₃.N—C  OH
|    |  |  \
|    |  |   O.C₂H₅
|    |  |   O.C₂H₅
CO   C  |  /
|    |  |  \
|    |  |   N.CH₃
|    |  |  /
CH₃ N—C =N      CO
```

Caffuric acid.

```
CO.OH
|  \
H.OC—N.CH₃
|    |   |  \
H(CH₃)N.C=N      CO
```

Caffoline.

```
HO.CH—N.CH₃
|    |   |  \
|    |   |   CO
|    |   |  /
H(CH₃)N.C = N
```

Caffeidine.

```
H(CH₃)N—CH
|    ‖
|    C—N.CH₃
|    |   |  \
H(CH₃)N—C—N      CO
```

Among the immediate congeners of uric acid is the body caffein, whose more ready solubility makes its introduction into the circulation in experimental researches much easier than that of uric acid. The intimate structural relationship between uric acid and caffein is shown at a glance when we compare their structural formulæ. The latter body, or vegetable uric acid, as it has been called, is known to stimulate the cardiac and vaso-motor centres, as its introduction into the circulation is rapidly followed by increased

rate of the heart's action, and marked rise of the arterial tension. We know that the application of such ganglionic stimulants, when applied to centres already overstrained, is to overpower them completely, and cause immediate vascular relaxation. There is every probability in the belief that the introduction into the circulation of uric acid, and many other products of rapid and perverted muscular metabolism is followed by the display of these phenomena in consecutive order.

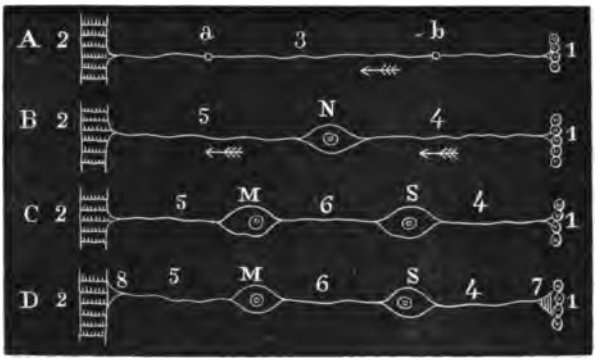
It is well known that the muscular system, as a whole, forms, even in health, the main factor in the production of heat within the animal system. It is the great furnace of the body; and, according to careful calculations, furnishes, during health, fully four-fifths of the total quantity of heat generated by the vital mechanism. The known relations between chemical transformation and liberation of heat offers a satisfactory explanation of the dependence of the latter on the complex molecular changes that are constantly taking place in the unstable constituents of muscular structures. Increased muscular activity means, of course, increased chemical change; and, as it is always accompanied by elevation of temperature, the very natural assumption has usually been made—almost without question—that the production of heat was a simple function of the production of work, the former always varying directly as the latter quantity. More recent researches went to show that the connection was somewhat more complex, but attempts were made, with apparent success, to define it in terms of a small number of variables. It was, however, reserved for my distinguished friend, Dr. Donald Macalister, of Cambridge, to successfully differentiate the thermogenic from the motor function. Starting with the very simple fact that heat is produced by a resting muscle, and asking himself the obvious question, "If heat is produced without contraction, may not contraction take place without heat?" Macalister has shown by a series of ingenious experiments that fatigue from over-stimulation and exhaustion from long abstinence, each differentiated the thermogenic from the motor function. The muscle was always fatigued as a heat-producer before it was exhausted as a work-producer. Further investigation showed, on the

other hand, that cold has the effect of greatly depressing or even abolishing the thermogenic function, while it leaves the motor function unaffected.

Further investigations on this subject have been carried out by Drs. Meade Smith and Lukjanow, from the results of which they conclude that "the effect of stimulating a muscle through its nerve is to start in it two processes—one, as it were, explosive, and manifested by change of form and performance of mechanical work; the other more continuous, and manifested by the increased development of heat. Each process has its own laws." These results justify the conclusion that "the heat developed in the second or thermogenic process is not simply a thermo-dynamic waste product—an excretion of no greater dignity than urea or carbonic acid."

Let us see what light the modern concepts of molecular physics may be made to throw on the thermal phenomena connected with excessive muscular disintegration. Matter, from whatever source, is made up of individual molecules, to each of which is allowed in the ordinary quiescent state a certain limited range of vibration. The effect of heat is to increase the range and velocity of vibration of each molecule, thereby causing the phenomenon of expansion. The action of heat on a given substance is represented on an exaggerated scale by this diagram. When cold it is represented by A, A′; when heated, by B, B′, Figs. 1 and 2.

Fig. 3.



The molecular movements of the various constituent tissues of

FIG. 1.

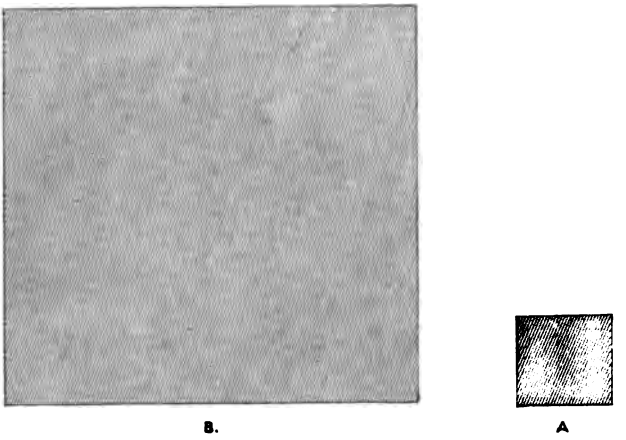
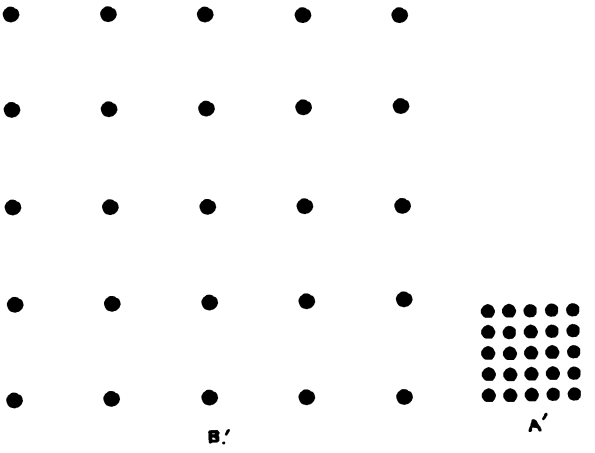


FIG. 2.



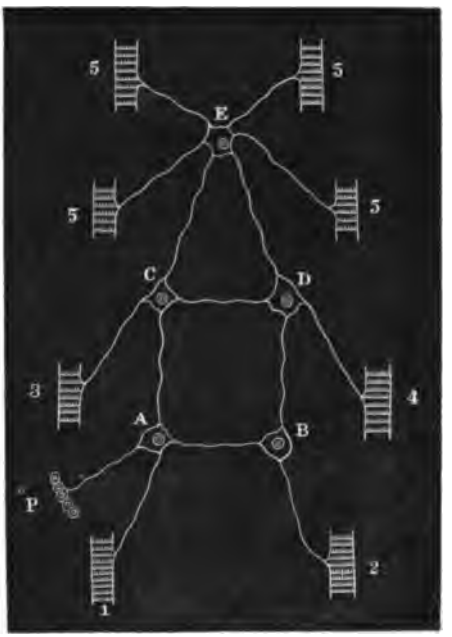
Dr. J. F. KNOTT ON THE FEVER OF OVER-EXERTION

Falconer Dublin

the living organism are undoubtedly under the direct control of the nervous system. The principles of government will be understood when we examine our next diagram. At B, Fig. 3, is represented a nervous arc, formed by a ganglionic nerve cell, connected in one direction with a sensory surface, and on the other with a motor end-organ.

The former connection is made by an afferent, the latter by an efferent, nerve-fibre. A further advance in the evolution of such nervous mechanisms is shown at C where two central ganglionic nerve-cells are connected by an internuncial nerve-fibre. Such peripheral sensory organs in all parts of the body are thus connected with corresponding centres in the spinal cord, while groups of the latter are in their turn connected with a centre of superior grade placed at a higher level. This graduated scale of increasing influence has probably very many degrees among the central ganglia; all the cells for one denomination being placed under the inhibitory influence of the superior centres in the cortex cerebri.

Fig. 4.



I have here (Fig. 4) given a diagrammatic scheme illustrating the super-position of such a series of reflex centres. The first ganglion cell in this lower series regulates the contraction, &c., of a certain muscle. A group of such muscles—three in the present instance—is under the control of a higher centre, the stimulation of which would lead to contraction of all three muscles, while the stimulation of an inferior cell would be followed by the contraction of but one. A cell of the third order presides over the movements of two muscular groups. Suppose, now, that the first of these groups is made up of the flexors of the leg, and the second of the flexors of the thigh, the cell which governs the movements of both will have under its control these two movements, which, when occurring simultaneously, constitutes one of the phases of walking; and by so ascending the ganglionic scale, we, by-and-bye, arrive at the supreme centre to which is deputed the control of all the co-ordinated movements of pedestrian exercise. A corresponding description applies to all complex groupings of superimposed reflex centres—motor, vaso-motor, secretory, and so on. An initial stimulus, starting from the periphery, and acting on the highest of these governing centres, suffices to develop, without the intervention of the will, all the corresponding reflex movements—molar or molecular, as the case may be—according to the functions of the centre concerned. The resulting series of phenomena follow the initial stimulus, pretty much as the whole complex mechanism of a chronometer is thrown into movement by a touch of the pendulum when the instrument has been just wound up.

On the other hand, when such stimulation is carried to over-fatigue, or applied to a centre already exhausted, it has only the effect of carrying the exhaustion to a still more extreme degree.

Let us now apply the information so far gained to the elucidation of the question more immediately before us. We are particularly concerned with the vaso-motor mechanisms of the muscular system. We have indicated that the uric acid and allied products thrown into the circulation by excessive or by perverted muscular metabolism act as a stimulus to a fresh and vigorous centre, while they rapidly exhaust the remaining powers of one already fatigued.

Even in the former case, the persistent presence of the unhealthy stimulus must necessarily be soon followed by paralytic phenomena. Vaso-motor paralysis of the muscular areas is the inevitable result of muscular overstrain. The vascular dilatation ensuing means, among other things, the presence of an excess of oxygen, the chemical activity of which helps to keep up the fever-heat. Every agency that contributes to the increased molecular agitation which constitutes fever-heat must keep up the unstable molecular equilibrium, and under these conditions the albuminoid molecules of the muscular tissue—whose constitution we have already depicted—being labile in structure, crumble down in rapid succession.

Each of the muscles which we employ in our daily avocations being made up of millions of such albuminoid obelisks, we can fancy what vast sources of heat and energy we carry concealed within us, and the consideration makes us admire still more the wonderful regulation of the mechanism by which the balance between waste and repair, between heat-production and heat-loss, is, in the healthy state of the system, so exquisitely maintained.

There has been a tendency abroad in the pathological world for a considerable number of years to refer most, if not all, of our febrile disturbances to the presence in the blood and tissues of certain minute parasitic organisms.

When a specimen of the bacterial tribe finds entrance to one of these domains of previously orderly molecules, the necessary results appear to correspond to those following the proverbial visit of a bull to a china-shop. Rapid and disorderly movements, followed by shivering of many constituent individuals into the simpler molecular or even atomic fragments is the inevitable consequence. The modern conception of heat being a mode of motion, an elevation of temperature is merely one of the manifestations of the agitation which ensues. The alarming rate at which the mischievous schizophyte reproduces its own image, necessitates, while other circumstances remain favourable, a progressive increase of such phenomena at a rate of compound interest.

As the scientific—and, indeed, the lay public as well—have heard a good deal of the vices of the bacterial brotherhood—which

were repeated even to some degree of monotony—many felt rather refreshed on hearing of the probability that a new scapegoat was to be furnished.

The activity of the minute vegetable parasites in the animal body appears to lead to the formation of—or, at least, to be accompanied by—the presence of *ptomaines*—perhaps excrementitious products. Still, bacteriologists have not been able to satisfy themselves that the occurrence of such bodies is constant, although the hypothesis has been confidently advanced by some that all the unpleasant constitutional symptoms are due to their presence.

Still more recently a new group of claimants to the conspicuous position of sole disease-producers has been brought to light by advancing chemical research. These junior pretenders have been baptised with the generic name of *leucomaines*, and their powers are referred solely to their chemical properties. The full admission of their claims, as placed in this manner before the scientific public, would involve complete exclusion of the microbes from the rights and privileges which have been for some years so freely conceded to them. On this very comprehensive question I could not even venture to express an opinion. To those who wish to come to any conclusion respecting the life and labours of the *bacterium*, the *micrococcus*, the *spirillum*, and the *vibrio*, the nature and scope of their operations in the past, and their probable achievements in the future, I would merely say, Are they not all written in the Book of the Chronicles of the Surgical Section of the Academy of Medicine in Ireland?

Of the precise pathological significance of the presence of any of these minute parasitic growths I know simply nothing, and I can only console myself for my ignorance by reflecting that many practitioners who have attained to high eminence in the public esteem know a great deal less than even that, if their written and spoken communications can be accepted as a reliable index of the state of their opinions.

And here I may notice how extremely modified are the circumstances and conditions of chemical changes within the animal body, as contrasted with the corresponding processes when artificially

produced outside the system. It is well known to the physiological chemist that rapid conjugation of benzoic acid with glycocine takes place in the human body at the ordinary temperature, when the former substance has been introduced into the alimentary canal. In the chemical laboratory a temperature of 160° C. (320° F.), with the expenditure of a good deal of manipulative skill and trouble, are necessary to bring about the corresponding result. The influence of the chemico-vital forces—and I venture to express my belief in such, although it is the fashion with the advanced scientist of the present day to ignore them—will perhaps account for this, and for many other mysterious phenomena of physiological chemistry. May they not inhibit the formation of fibrin within the healthy living blood-vessels? May they not inhibit the coagulation of albumens at paradoxically high temperatures, of which our President, had, I believe, some years ago a very remarkable example under his care, and whose existence has been, to my mind, very unsatisfactorily explained by attributing ingenious powers of physical experimentation, or rather of physical conjuring, to utterly uneducated patients?

These considerations, however, involve a digression from the subject more immediately before me, so I will return to an examination of the nervous influences concerned in the development of fever-heat.

The experiments of Aronsohn and Sachs have demonstrated that stimulation of a limited area within the medial portion of the corpus striatum—situated near the *nodus cursorius* of Nothnagel—causes an immediate rise of temperature in the muscles; with a corresponding elevation in the rectum, and also upon the surface. This artificial fever was accompanied by increased consumption of oxygen, and increased elimination of carbonic acid and of urea; the respective amount of the quantities being about equal to what would have been produced by ordinary fever of corresponding intensity. No motor, and apparently no vaso-motor phenomena accompanied these remarkable results; and the obvious deduction was made that in this region we have a veritable *thermogenic* centre.

Again, section of the spinal cord high up in the neck has been

followed by various and not always very intelligible effects on the temperature of the organism. But when the section is made at the junction of pons with medulla, we have the constant result of increased evolution of heat. Stimulation in the same situation is found to be followed by a decided diminution of heat-production. These experimental facts point clearly to the existence of inhibitory fibres in that situation, and a regulating or *thermotaxic* centre, from which they are derived.

Sixteen years ago Liebermeister explained the heat-regulation of the animal body by the existence of two such reflex centres—an *excitor* and a *moderator*—both located in the intracranial portion of the cerebro-spinal axis, and whose influences, during the healthy state of the body, accurately balanced one another. In the present year Dr. Macalister formulates the state of our hypothetical knowledge of the subject as follows:—"The thermogenic tonus of a resting muscle is dependent on a balance between the nervous impulses subserving anabolism and those subserving catabolism of thermogen." "*Thermogenic tonus*" here expresses the healthy equilibrium between heat-production and heat-loss; "*anabolism*" and "*catabolism*," in Cambridge nomenclature, signify upbuilding and unbuilding (or construction and destruction) respectively; thermogen is the convenient term coined by the writer to denote the heat-producing (thermogenic) stuff of a muscle as distinguished from the contractile, and whose existence as a separate entity he has demonstrated by the experiments above referred to. This author comes to the conclusion that the thermal nervous system includes three parts: a *thermogenic*, or producing; a *thermotaxic*, or adjusting; and a *thermolytic*, or discharging mechanism. More extended experimental investigation is necessary before a final opinion can be arrived at, but the balance of evidence at present before us entirely favours Dr. Macalister's views.

In the ascending scale of evolution, our thermotaxic centre is the last to be developed. In cold-blooded animals it is non-existent. In the young mammal (in the human infant, for instance) it is unable to assert its influence; and, accordingly, the instability of temperature is its main characteristic at this period of our

existence. Its action is certainly reflex, and, accordingly, its position and connections would be accurately represented in schematic form by the diagram before us. Besides being latest of our thermal centres in growth, its influence is more easily disturbed than is that of the others. Its functions are early thrown into complete abeyance by the vaso-motor and nutritional changes we have been considering; and we have thus explained one of the most prominent features of febrile temperature—the readiness by which it is affected by slight disturbing causes.

Let us now return to the nutritional disturbances first set a-going by the passage into the circulation of the products of excessive muscular disintegration. We have seen how these products first stimulate and afterwards paralyse the vaso-motor centre.

The imperial nervous centre, when thus paralysed, is unable to retain its influence over the local and subsidiary centres which more immediately regulate the chemico-vital processes that are continually going forward in the muscular tissues. The latter centres themselves suffer by a corresponding exhausting influence. The graduated series of bonds which had connected the various molecular groups with the central governing mechanism are broken or rendered temporarily ineffective. Home Rule being thus established among the muscular municipalities, high jinks immediately commence. The individual molecules, previously vibrating within a limited range, and with a moderate *vis viva*, begin to oscillate with increased rapidity; and in endeavouring to increase the range of their movements, they collide against their equally ambitious neighbours with increased momentum—in fact, every increase of temperature above the normal level sets up an agitation for expansion of the territory claimed by each member of the community. The question of eviction or of "landgrabbing" can hardly here be raised, as all the individuals of the commonwealth possess a social and political value exactly equal, and conspiracies and "leaguing" of every kind are unknown, for each individual is equally attracted in all directions by his surrounding neighbours, with the necessary result that he is unable to bind himself to any.

So long as the source of heat is supplied the molecular agitation has no natural tendency to come to rest.

Modern researches on the phenomena of thermo-chemistry, and on the precise relations between energy, heat, and chemical change, have helped to throw additional side-lights on these complicated molecular changes. The initial impetus in these laborious investigations is chiefly due to the enthusiasm of Berthelot, and they have been extended in nearly every available direction by the admirable researches of Thomsen. Berthelot's conclusions on the connection between thermal manifestations and chemical change led him to formulate his celebrated "law of maximum work" in these terms:—"Every chemical change accomplished without the addition of energy from without tends to the formation of that body or system of bodies the production of which is accompanied by the evolution of the maximum quantity of heat." Also in its correlated form as the "theorem of the necessity of reactions," thus:—"Every chemical change which can be accomplished without the aid of a preliminary action or the addition of energy from without the system, necessarily occurs if it is accompanied by disengagement of heat." The law of maximum work has been rather roughly handled by recent critics, yet it is still upheld in forms more or less modified by many of the most eminent chemists; and even our most recent English authority, Pattison Muir, although by no means ready to acknowledge the authority of the law in all its necessary consequences, acknowledges that "when the physical conditions of comparable chemical processes are kept as nearly as possible constant, the process which involves the maximum production of heat very frequently occurs in preference to the other possible processes, or occurs to a considerably greater extent than any of those other processes."

The most indefatigable of all workers in the domain of thermo-chemistry—Thomsen—has stated the law of maximum work in the following form:—

"Every simple or complex reaction of a purely chemical kind is accompanied by evolution of heat." In explanation of this phraseology, he tells us that by a reaction of a purely chemical kind, he

understands one which "proceeds without the expenditure of external energy, and is accomplished only through the striving of the atoms towards more stable equilibrium. The occurrence and nature of the reaction depend chiefly, according to the writer, on (1) the striving of the atoms of the reacting bodies towards stable equilibrium; (2) the resistance of the molecules to decomposition; and (3) the stability of the possible products at the temperature produced by the reaction. The greater the molecular mobility and the atomic mobility of a given chemical system, the more ready will that system be to undergo change; and the less the molecular and atomic mobilities the more stable the system. In every purely chemical reaction these two will tend towards a minimum. The reduction of molecular and atomic mobility will be attended by evolution of heat. In other words, all the thermal manifestations of purely chemical origin are examples of the degradation of energy which Sir William Thomson tells us is going on throughout the length and breadth of the universe, and which, according to him, must go on progressing till a uniform dead level of temperature has been established in all regions of space.

In summarising my conclusions, then, I would say that if I have read aright the clinical history of the class of cases to which I have now called the attention of the Medical Section, their essential feature is the presence in the circulation of a large excess of the chemical products of muscular waste, rapidly leading to an overthrow of the governing powers of the thermotaxic nerve centre. Under favourable circumstances the elimination of such effete material from the system would be soon followed by restoration of its adjusting function. When the elimination has, however, been long retarded, this centre, which, as we have already seen, always is in the febrile state, the first to lose, and the last to regain its authority, will be found to have permanently abdicated its claims, and the anarchic condition remains, during which all the physical enemies of life are permitted to go on sapping its powers.

With regard to the treatment of such a febrile condition as the one we have been considering, some further remarks may be found suggestive. Authorities on the subject of ephemeral fevers are

fairly unanimous in telling us that for such conditions no specific treatment is necessary. The early administration of a purge, followed by saline diaphoretics and diuretics, with ordinary remedies for any other troublesome symptoms, such as headache or sleeplessness—are all that we usually hear recommended.

To anyone who has noticed the minor symptoms of simple febrile conditions with the attention which they deserve but do not always receive, the extreme gratification produced by small quantities of moderately acid drinks will be very familiar. I suppose it is on this account that physicians are so much in the habit of prescribing for administration on a considerable scale dilute solutions of the mineral acids. Grapes, lemons, and some other fruits form convenient vehicles for administration of certain organic acids, and are very acceptable to the patient. They cannot be so conveniently made the basis of an orthodox prescription, and perhaps for that reason, among others, are regarded with more favour by the patient, and perhaps by his nurse, than by the visiting physician. Yet I believe that they are sound therapeutic agents, and that the taste which fever patients so usually display for these things is a truly conservative provision of nature. I have elsewhere within the present year endeavoured to call the attention of the profession to the importance of the use of some organic acids in promoting the elimination from the system of urates and other products of excessive or of perverted tissue-change. The power which certain organic bodies have of retaining in solution compounds otherwise easily precipitable is utilised in several Pharmacopœial preparations, and is indeed often a source of annoyance to the analytical chemist whose manual labour it increases very considerably. The preparation of the Liq. bismuthi et ammonii citratis exemplifies the utilisation of such property possessed by the acid of lemon juice, while the well-known test solution of Fehling shows a corresponding property of the principal acid of the grape. That the introduction of these acids or their soluble salts into the animal economy determines the solution and consequent elimination of the deleterious products above referred to, there can be no doubt whatever, and I would accordingly venture to recommend their systematic administration in cases where the

system is surcharged with waste material. The usefulness of a saline purge is unquestioned. Its efficacy is appreciated by the labouring poor themselves, and it is usually administered in the shape of enormous doses of Epsom, or (still better, because cheaper) of Glauber's salts. Up to half a pound of the latter is often administered to a strong country labourer. The great adjunct to this treatment in former days was to utilise the services of the country bleeder; and the wise woman of the district, whose authority I have so frequently quoted, lays the blame of the death of some of the most promising "boys" in her neighbourhood on the authorities who have made this remedy unattainable, even rather than on the dispensary doctor, who, according to her account, knows nothing about it, or will not employ the treatment she suggests. The adoption of such a remedy now possesses, of course, but a historic interest.

To the use of the mineral acids I would object, that although their administration affords a momentary relief by lessening the thirst from which the patient suffers, their ultimate effect on the tissues and circulation is to aggravate the existing mischief by setting free the uric acid from its compounds. The organic acids, on the other hand, whose uses I advocate, have the effect—with or without chemical change—of determining the solution of the deleterious organic compounds present in the fluids of the body, and so promoting their ready elimination from the system.

With regard to the treatment of the chronic stages of the condition I have described, I would expect the best results from a carefully-regulated diet, with the internal use of quinine and salicylic acid, as antipyretic remedies. Change of air, especially to the seaside, would be very desirable, but in the great majority of the cases I am now dealing with this is quite unattainable.

In drawing to the close of my communication, I wish to thank my audience for the patience with which they have listened to what I have had to say, and to express my hope that the attention of wiser and more experienced heads than mine may soon throw additional light on the somewhat complicated questions which I have thus crudely broached.

SECTION OF SURGERY.

TREPHINING IN MASTOID AND TYMPANIC DISEASE.

By J. DALLAS PRATT, F.R.C.S.; M.A., M.D., B.Ch., Univ Dubl.;
Late Resident Surgeon, City of Dublin Hospital.

[Read in the Section of Surgery, November 11, 1887.]

The case which I venture to bring under the notice of the Profession is, I think, one of considerable interest, not only on account of its comparative rarity and of the success of the operation, but also because of certain points which arose in connection with it which have not been present in similar cases.

The disease for which the operation is done is not uncommon, but the operation which I performed is not frequently resorted to. For these reasons, therefore, I bring under your notice the notes of the case:—

Private H. Burbeck, 1st Batt., 71st H.L.I., was admitted to the Station Hospital, Beggarsbush, on March 30th, 1885. He was a strong-looking man, aged nineteen, and had 1½ years' service. About ten years previously he had suffered from scarlatina, and had then a discharge from his ear, which had continued ever since. Some six or seven weeks before his admission he had got pain in the ear, and pain and considerable tenderness over the mastoid process. The immediate cause of his going sick was the increased difficulty in hearing, as on the night previous to his coming to hospital he had been three times challenged by the sentry, and became aware of it only when he saw the lamp over the barrack-gate shine on the bayonet as it was brought to the charge.

Having tried various injections, all of which failed to be of the least use, and having ascertained by the use of a speculum that

there was a perforated condition of the membrana tympani, I resolved to trephine the mastoid region to allow the discharge free vent. Accordingly, on the 18th of April I had the patient put under the influence of ether by my friend, Mr. Middleton—Mr. Wheeler, Surgeon-General J. J. Thompson, Principal Medical Officer, Dublin District, Dr. Harley, and Dr. Haddon, also being present. A crucial incision having been made behind the left ear, with the centre opposite the external auditory meatus, the periosteum was divided and reflected; the crown of a small trephine was placed on the bone in such a position that the whole of the trephine was anterior to a vertical line bisecting the mastoid process, and the lower border on a level with the external auditory meatus. The bone was then cautiously cut through down to the dura mater, and the piece removed by means of an elevator. When the trephine had penetrated to about half the thickness of the skull there was some hæmorrhage, which was arrested by pressing a bit of lint into the wound for a moment or two. On removing the piece of bone the dura mater was plainly visible, and the wound was then plugged with dry lint, the skin wound being left open and a hot fomentation applied over it; the patient was then removed to bed. The portion of bone removed had a softened inner surface.

The patient had an evening temperature of 99° F.; pulse, 80. He was put on two pints of beef-tea, and four pints of milk. On the next morning (April 19) his temperature was 100° F.; pulse, 80. He had slept for four hours. There was no pain or headache, only the soreness of the external wound giving him any trouble. The plugs were changed, and pus flowed from the wound. Evening temperature, 98·8°; pulse, 76. He had some sleep during the day.

20th.—Morning temperature, 98·4°; pulse, 76. No pain, but did not sleep. Evening temperature, 98·4°; pulse, 80.

21st.—Morning temperature, 98·4°; pulse, 76. On this day I handed over the case to Surgeon-Major Charlton, who took over charge of the Hospital, and to him I am indebted for the notes of the case from that date. I, of course, saw the man with him frequently.

25th.—Slept fairly last night after taking a draught containing chloral hyd., 15 gr.; liq. opii sed., 20ɱ; potass. brom., 15 gr. Case doing well; wound healthy. Hot fomentation.

27th.—Progressing satisfactorily; stupes continued; ordered 10 grs. pulv. ipecac. co.

May 3.—Wound filling up; no pain; continued stupes; ordered chop.

May 15.—Some pus coming from the external auditory meatus, which was found to proceed from an abscess in the pinna, opening close to the external meatus. This was incised, and the matter evacuated; some threads of silk put through to act as a drainage tube.

May 24th.—Some discharge going on from the external abscess; stupes discontinued.

June 2nd.—The abscess having re-filled, was opened more freely, and fomentations again put on.

June 8th.—Case has progressed most satisfactorily; no discharge from ear for some time; trephine wound closing rapidly.

23rd.—Slight discharge from track of abscess; syringed with sol. chlor. zinc, and blew iodoform in.

29th.—No discharge; hearing greatly improved.

I saw the patient a few days before he went on sick furlough, when all discharge had ceased, and the hearing was almost as good as in the sound ear. Some months after this he was examined at Belfast by the medical officer in charge, and also by the principal medical officer of the district, for a draft going to the other battalion in India, and he was passed by them as fit for service in that country.

That some operative measure should be adopted in cases of protracted discharge from the ear, which is not amenable to milder treatments, and which is accompanied by perforation of the membrana tympani, with, or even without, pain and tenderness over the mastoid region, is, I think, certain; and this idea was impressed on my mind very forcibly by the fact that I saw two of these cases not operated on die with symptoms of compression, and that, too, quite suddenly, only a very few hours having elapsed between the first symptoms of pressure and the fatal termination I have endeavoured to collect as many of these cases as possible, with the various operations that have been done on them, with a view of determining which of these operations is the most satisfactory. We may divide the operations into three classes for convenience of comparison:—First, the operation which was done in this case on the lines set forth by Mr. Wheeler; secondly, the operations of opening the

mastoid cells by drill, gouge, chisel or bit; and thirdly, those resorted to by A. E. Barker, Hulke and Edmunds, and which consist of two distinct operations—gouging the mastoid down to the cells, and afterwards trephining the skull at a point one and a quarter inches behind, and one and a quarter inches above the external auditory meatus, which corresponded to the inferior posterior angle of the parietal bone, close to the squamosal suture (Barker's Case); trephining 1 cm. above the auditory meatus (Hulke's first case); gouging the mastoid down to the cells, and then trephining the skull 2 cms. behind and inward of the mastoid process, the crown of the trephine encroaching on the inferior curved line (Hulke's Cases, 2 and 3); and trephining three quarters of an inch behind the meatus, avoiding the mastoid cells (Edmund's Case).

Of these operations opening the mastoid cells was suggested by Riolan (1649). Valsalva, in 1704, caused fluid to permeate to the middle ear by trephining in a case of otitis, with a sinus behind the auricle. Rolfink, in 1656, pierced the mastoid process for deafness and singing in the ear. Hartmann advised the operation in cases of caries, with accumulation of pus in mastoid cells. In 1724, J. L. Petit performed the operation with a chisel; his case was successful. After this the operation, having become known, was practised in an indiscriminate manner as a general cure for deafness, and was looked on as safe until the death of Dr. von Berger, of Copenhagen, in whose case it was performed as a cure for deafness with painful singing in the ears, showed the contrary, and the operation fell into disuse—all the specialists and most surgeons (notably Dieffenbach) reprobating it. Forget 1849, and Follin, 1859, again called the attention of the profession by publishing one or two successful cases; but it was the paper written by von Tröltsch, in 1861, making mention of successful cases by Jasser, Fielitz, Weber, Forget, Follin, and himself, but not mentioning any of the fatal ones, except that of von Berger, that brought the operation into note.

Professor Schwartze, in a paper read at the International Medical Congress, in 1884, at Copenhagen, says that, in spite of von Tröltsch's paper, the operation was confined to individual cases,

which were mostly resultless. Looking at more recent statistics, the operation would not seem so favourable as represented by von Tröltsch. Of fifteen cases published by Kilham, Dalby (2), Lippincott, Strawbridge (3), Simon Snell, Meyer (3), Kapp, Pomeroy, Beard, and Henry Morris—4 died, or nearly 27 per cent. Ashhurst mentions, as one of the dangers of making Wilde's incision, the formation of a false aneurysm on the posterior auricular artery if the cut is not made far enough back, and states that this had occurred in his own hands, and also in a case recorded by Kapp.

I next come to examine the operations as described by Mr. Barker and Mr. Hulke. Of the four cases on record, three have terminated fatally, or 75 per cent.—an alarming mortality for any operation, but to be accounted for in part, at any rate, by the fact that, in three of the cases, a double operation was done; first the gouging operation, which, of itself, has a mortality of 27 per cent., and afterwards trephining the skull, with whatever danger attaches to it.

The operation on the lines laid down by Mr. Wheeler—that is, placing the trephine so that the whole of its crown is anterior to a vertical line bisecting the mastoid process, and its lower border, on a level with the external auditory meatus, and perforating the bone down to the dura mater, opening the mastoid cells, the middle ear, and cranial cavity at one operation, and enabling the operator to reach the temporo-sphenoidal lobe by the most easy method—seems to be the most successful. Fifteen cases are on record—seven by Mr. Wheeler, one by Mr Fitzgibbon, one by a surgeon in Wicklow, two by Langdon, one by Victor Horsley, one by Truckenbrood, and the present case. Of these, Langdon's cases died, the rest recovered, or thirteen recoveries out of fifteen cases, or only 13·8 per cent. of deaths. On the other hand, all the cases I have seen published, eight in number, in which no operation has been attempted, have terminated fatally. From all these considerations taken together, I have come to the conclusion that the operation with the trephine, in this particular position, is the most favourable, and that it should be resorted to in all cases where caries of the bone is diagnosed, or where an abscess in the temporo-sphenoidal lobe is suspected, in

prolonged and intractable otorrhœa, with perforation of the membrane, or where there is pain and tenderness over the mastoid process. Even should the operator, for any reason, wish only to open the mastoid cells, it would be far better to do so with a trephine, than with gouge, chisel, bit, or gimlet. All the latter instruments are unhandy and dangerous, as it is difficult to tell how far any of them may penetrate through even sound bone, and, of course, still more difficult in the case of carious diplöe. Schwartze, the greatest advocate of this instrument, seems to fear it, as he is careful to warn the operator to place his finger close to the point, to guard it from plunging suddenly into the diseased structure; Ashhurst also notes this danger.

The hammer and chisel are still more unscientific; if the chisel be used the hammer is quite unnecessary. The trephine is manageable, and there is no danger of sudden penetration, as the bone is cut by friction and not by force. With regard to the size of the instrument used, Mr. Wheeler's first case was done with a large trephine about 18 mm. diameter; but his later ones and my own case were done with a much smaller instrument—about 15 mm.—and this was found to answer the purpose equally well; the peculiar points in connection with my own case being the hæmorrhage from a vein—probably the middle temporal diplöic—when the bone was about half cut through, the abscess forming in the pinna, and the very slight constitutional disturbance following the operation—the temperature only on one occasion going above normal.

SERIOUS BRAIN SYMPTOMS FOLLOWING PYÆMIA.

By NATHANIEL MAYNE, L.R.C.S.; L.K.Q.C.P.;
Surgeon to the Longford Infirmary.

[Read in the Section of Surgery, November 11, 1887.]

A. B., aged twenty-seven, who, about the middle of March, had a scratch on her finger, had been dressing a wound. A few days afterwards her finger got sore, the arm became painful, the glands in the axilla very sore and swollen. After a few days these symptoms passed off, but she felt languid and lost her appetite. Her throat became sore on the left side, the tonsil greatly enlarged and painful. On the 4th of April I opened it, when a quantity of pus escaped. Owing to her weak state I ordered her a mixture of bark and ammonia.

On the 13th she had great pain, and could not open her mouth; the parotid gland was very swollen and inflamed; ordered poultices. I went on the 22nd for the purpose of opening the abscess, and found it had burst into the external ear. On making pressure over the region of the parotid a large quantity of fœtid pus welled up; poultices continued. On the 2nd April discharge was greatly diminished; ordered lin. pot. iod. C. Saponis to be used night and morning.

6th.—Discharge diminishing; wadding to be applied during the day instead of poultice.

10th.—Discharge ceased; poultices discontinued; liniment as usual; if weather fine to take open-air exercise.

14th.—Paralysis of left side of face, which I ascribed to a cold draught from sitting at open window. Counter-irritation to be applied; also electricity, which she strongly objected to.

18th.—Paralysis not so well marked.

23rd.—Paralysis now disappeared.

27th.—Lancinating pain over right side of head, which she declares she cannot bear; pain not increased by pressure; most intense and localised posterior to frontal suture; pulse very weak; want of sleep, and is very irritable; ordered anodynes, hydrat. chloral, and brom. pot.

29th.—Anodyne had no effect; slept badly; pain very acute; complains of "tears flowing into right eye, preventing her seeing properly;" vision of right eye impaired, and pupil contracted.

30th.—Drove into Longford in a very easy vehicle; was very irritable all day.

31st.—Pain very intense; repeated large doses of anodynes had no effect; very irritable and cannot sleep; severe rigor during the night; complains of tingling of left arm.

2nd May.—Pain of right side of head so intense she threatens to knock it against mantelpiece; drags the left leg; cannot articulate properly; paralysis of right side of face; right pupil dilated; vision of right eye impaired; misapplies words.

3rd, 4th, 5th, 6th.—Seems much worse, but on latter day symptoms aggravated.

7th.—Mr. Fitzgibbon saw patient, and suggested trephining of left mastoid, which was done on the 10th, about 10 30 p.m. No pus was found. For several days the patient grew steadily worse.

On the 18th there was paralysis of sphincters. She continued in this state for several days, and became comatose.

On the 30th the paralysis seemed not so well marked, and she was able to move her legs; the coma now gave place to noisy delirium, which continued for several weeks, during which time counter-irritants, blisters, and iodide of mercury were in constant use, and the iodides of potassium and iron were given internally with cod-liver oil, pepsine, and other tonics. I was unfavourable to the mastoid trephining, although the patient had had in early life otorrhœa after scarlatina; but as the drum of the ear was perfect, and the discharge had not been present for years, and as during that time she had not been troubled with any brain symptoms, I saw no grounds for believing that trephining the left

mastoid would benefit the case. All the symptoms pointed to brain trouble on the right side—probably about the fissure of Rolando. Had there been any evidence of mastoid trouble such as Mr. Wheeler records on the 61st page, Vol. I., of the Academy's Transactions, I would not have been so opposed to the operation. Eventually health was restored.

PENETRATING WOUND OF THE STOMACH AND TRANSVERSE MESO-COLON SUCCESSFULLY TREATED BY ABDOMINAL SECTION.

By CHARLES B. BALL, M.D., Ch.M.;
University Examiner in Surgery; Surgeon, Sir P. Dun's Hospital;
Fellow and Examiner in Surgery, Royal College of Surgeons in Ireland.

[Read in the Surgical Section, March 28, 1888.]

Cases of penetrating wound of the abdomen, for the treatment of which abdominal section has been performed, are of considerable interest to the surgeon; and the number of instances in which this operation has been performed, although it has increased considerably during the past few years, is still small; it is therefore of importance that individual cases should be put on record. This must be my apology for narrating a single case that came under my care:—

H. R., a lad of fifteen years of age, a carpenter by trade, was admitted into Sir Patrick Dun's Hospital on March 29, 1887, immediately after having stabbed himself in the abdomen with a half-inch chisel. The accident was stated to have occurred in the following manner:—He was putting the chisel into a handle, and for this purpose he held the blade with both hands, with the cutting edge towards his abdomen, and firmly pressed the handle against a wall; his hands suddenly slipped, and the chisel perforated his abdomen about half way between the tip of the ensiform cartilage and the umbilicus, a quarter of an inch to the right side of the linea alba, the direction of the wound being vertical.

Upon his admission to hospital it was not at first thought that he had sustained any grave internal injury. Collapse, however, became more marked, and two and a half hours after the injury he vomited part of the contents of his stomach stained with blood. The vomiting became frequent, and the quantity of blood considerable. I saw him four hours after the injury; he was then

profoundly collapsed; he vomited blood at frequent intervals, and at each effort to vomit, a stream of blood spurted out at the abdominal wound. The whole abdomen was dull upon percussion, apparently due to the peritoneum being filled with blood; it was evident that some large abdominal vessel had been perforated, and also some of the hollow viscera, and that unless the bleeding could be stopped the boy would die in a very short time. I therefore decided upon opening the abdomen immediately, as affording the only possible, although slight, chance of saving life.

An incision about three inches in length was made in the middle line between the ensiform cartilage and the umbilicus and the chisel wound connected with it. As soon as the peritoneum was opened a large quantity of blood gushed out; a search for the extent of the internal lesions was now instituted, and the stomach was found to be wounded. A clean cut existed in the greater curvature, about half an inch in length; it was not bleeding to any extent, the mucous membrane was not prolapsed, and none of the contents of the stomach were found extravasated. Some extravasation may, however, have taken place, but was not observed owing to the quantity of blood about. The wound in the stomach was now sutured up, the needle being passed through the serous membrane only, after the method of Lembert, but the suture was a continuous one, the ends being knotted together.

As the bleeding still continued freely, I looked for other wounds. The great omentum was reflected upwards, and a systematic search instituted. Upon passing my finger along the under-surface of the transverse meso-colon, I was able to feel a wound in it, and as soon as the blood was sponged away it was found that a large vein had been wounded, and that it was bleeding very freely. With the assistance of my colleague, Prof. Bennett, this vessel was secured, and further careful search failed to discover any other injuries. The peritoneum was carefully sponged out and the wound closed in the usual manner; the patient during the performance of the operation was greatly collapsed, so much so that it was feared he would die on the table. Shortly after being removed to bed he vomited, but the ejected matter was free from blood. All food by the mouth was absolutely interdicted, but he was allowed small pieces of ice to suck occasionally. He was nourished by zyminised meat suppositories and by nutrient enemata, made according to the following prescriptions:—

℞. Tinct. opii, ♏. x.
Potassæ bicarb., gr. x.
Liq. pancreaticus, ʒi.

M. Add half an ounce of brandy, the yolks of two eggs, and cream to 4 ounces.

℞. Tinct. opii, ♏. x.
Acid hydrochlor., dil., ♏. x.
Liq. pepticus, ʒi.

M. Add half an ounce of brandy, the whites of two eggs, and beef essence to 4 ounces. One of the above enemata to be given alternately every four hours.

He passed a good night, and the day following his pulse was somewhat stronger, and he did not appear to be quite so blanched.

On the third day he vomited some pieces of onion quite unchanged, which he stated he had eaten shortly before the accident.

On the sixth day he was, for the first time, allowed fluid nourishment by the mouth, small quantities of strained beef-tea being given him, and the day following milk was added to his diet.

On the 9th day the enemata were stopped, as he was able to take by the mouth sufficient fluid nourishment. He was not allowed solid food until the 14th day, when he appeared to be quite convalescent. His temperature remained afebrile during the entire course.

In the case that I have thus briefly endeavoured to detail there are several points of interest. When I found the wound in the stomach I expected that the chisel had transfixed that viscus, but a most careful search failed to find more than a single opening, and yet we had a wound of the transverse meso-colon at a level below and behind the stomach. I think that the explanation of this fact is, that the stomach was incised by the angle and not by the full cutting edge of the chisel, and that the blade passed through the great omentum between the stomach and transverse colon, and then through the transverse meso-colon from above. The aperture in the stomach was not blocked by a prolapse of mucous membrane such as is usually stated to be the case when any of the hollow abdominal viscera are wounded; and although it was free enough to allow the escape of blood from the general peritoneal cavity into the stomach, it did not permit of any exten-

sive extravasation of the contents of that viscus. Another point of interest in the case was the way in which I was able to localise the lesion of the transverse meso-colon at the bottom of a pool of blood by the sense of touch alone; as the finger glided over the smooth peritoneum it readily recognised the cut surface, which was gaping somewhat.

The form of suture employed had the effect of completely closing the opening, and at the same time puckered up the peritoneum around the aperture in the stomach; this, I take it, is a matter of small importance where the wound is of trivial length, but I should hesitate to apply it to the small intestine for any but the very smallest wound.

The history of wounds of the stomach affords but few examples of recovery. Sir William M'Cormac, in his recent valuable work on abdominal section for the treatment of intra-peritoneal injury, when speaking of wounds of the stomach, says:—"The injury is occasionally but very rarely recovered from, and we may set down the mortality at 99 per cent. where no operation is performed."

Recovery can only take place where the wound is extremely small, and where no extravasation has taken place; or again, in a few very rare cases, by the establishment of a gastric fistula, as in the classical case of Alexis St. Martin.

In these cases the correct treatment unquestionably is to perform abdominal section; if the wound is very extensive the question may arise as to whether it would not be better to stitch the stomach wound to the abdominal wall, and advisedly form a gastric fistula in the first instance; but most surgeons appear to prefer closing the wound completely and returning it into the abdominal cavity.

From the carefully-compiled table of cases given by Sir W. M'Cormac, it appears that laparotomy for stab wound involving the stomach has hitherto been performed twice only—once by Tiling, of St. Petersburg, in which, in addition to the wound in the stomach, there was a wound one and a half inches long in the intestines; and a second by Wunderlich; the former recovered but the latter died. And in five cases in which abdominal section

was performed for gunshot wound of the stomach, but one case—that recorded by Prof. Kocher of Berne—recovered.

In my own case the danger which immediately threatened life was the copious bleeding from the wounded vein, and which I have no doubt must have proved fatal in an hour or two but for the intervention of surgery.

TWO FATAL CASES OF FOREIGN BODIES IN THE ŒSOPHAGUS.

By WILLIAM THOMSON, M.A., F.R.C.S.;
Surgeon to the Richmond Hospital, Dublin.

[Read in the Section of Surgery, December 9, 1887.]

We have had before this Section some cases of foreign body in the pharynx or the œsophagus, in which the operation of opening into the canal from without has been performed, and the offending objects have been successfully removed. The cases which I have to report differ from those in that they were both fatal; but the conditions in each were such that death followed with great rapidity. In one case, however, I think, we shall find more than one subject for consideration, and some lessons that it may be well to bear in mind.

The œsophagus presents, from its function and its physical characters, peculiar facilities for obstruction of different kinds. Carelessness in mastication of food, the acts of lunatics, the desire to perform astonishing tricks, have each contributed to provide the curious list of foreign bodies in the œsophagus which we can gather from surgical literature. Thus, the surgeon's help has been sought in such curious obstructing things as I may here enumerate—lizards, mice, frogs, razors, knives and scissors, thermometers, a butcher's hone, padlocks, fish-hooks, and a child's saucer. And yet this list only includes the most curious; it does include the more ordinary foreign bodies with which we are most familiar. The modes of dealing with these are sufficiently varied, and we see in the numerous apparatus which have been devised proof of the difficulties which always surround such cases. The length of the tube, its collapsed condition except when permitting the passage of some material, the difficulty of dealing with a body at a

considerable distance from the mouth, when the surgeon can neither see that body nor feel it with a finger, render interference at all times uncertain. We are often unable to determine what mischief has been done; and our very treatment may be the means of accelerating death when we only desire to save life.

The first case which I mention is that of a labouring man, who was at dinner in an eating-house near the hospital. He was observed to become suddenly convulsed, to make efforts to breathe, and he speedily fell to the ground. Carried to the hospital he was found to be dead; and it was not very clear what was the cause of death. But, at a *post-mortem* examination, a large piece of beef, partly masticated, was found wedged into his pharynx and the upper part of the œsophagus. It weighed just a quarter of a pound. It was not visible from the mouth, but it could have been felt with the finger. The epiglottis was tightly closed, and the patient was simply suffocated.

Here was a case in which a timely interference could have saved life, for the fragment was within reach of forceps, and, at all events, a rapid tracheotomy would have given time for further dealing with the mass. But help was not immediately available. Still, knowing what we do of the possibilities of restoring animation in those apparently dead from drowning or other asphyxiating conditions, it seems to me that had the cause been recognised, those who dealt with the case at the hospital might have hoped for a good result from artificial respiration after opening of the trachea.

The second case is of greater interest because it is of a more unusual character, and suggests questions which, I think, may be profitably discussed here. D. G., aged fifty, was admitted to the Richmond Hospital on Sunday morning, 25th September, 1887, suffering from severe dyspnœa. He stated that while eating his dinner on the previous day a piece of beef stuck fast while he was trying to swallow it, and that he suffered much pain at the time. He was unable to swallow anything but a little water afterwards, and his breathing soon became difficult. Alarmed by his condition he was advised to go to a hospital in the city, where he was seen and treated. A long tube, as he described it, was passed into his

œsophagus for about twelve inches, and an effort made to push down the obstructing mass. He suffered a good deal from the operation. He was sent home, but he found that instead of feeling relieved the pain was worse, the power of swallowing was not increased, and he noticed that his neck and face began to swell. The symptoms continued to increase during the night, and he came into the Richmond early next morning. I was at once sent for, and I saw him about eleven o'clock. He was sitting up in bed, his face and neck were greatly swollen, the breathing was strident, his voice was low and husky, and he had a short gasping cough. The eyelids were swollen to a considerable size, and his face was altogether most unsightly. He detailed the history which I have just given.

On examining the tissues of the neck, face, and orbits, it was obvious that there was extensive emphysema. He made an attempt to swallow, and the water regurgitated into his mouth, but after a few efforts it seemed to pass down the œsophagus. I made an exploration of the pharynx with my finger, but I could detect no foreign body; then I introduced a tube into the mouth, but when it had reached the epiglottic region he was immediately attacked by a most alarming laryngeal spasm, with cough, which made me at once desist from any further attempt in this way.

I had soon afterwards the advantage of discussing the case with Mr. Corley, our President, and we very carefully considered the various points presented. There was no doubt that the foreign body was still impacted, but for the moment the pressing symptom was the dyspnœa. We agreed that no attempt should now be made to deal with the mass; but that later on, if symptoms became more urgent, I should perform tracheotomy, and subsequently determine by an exploration the position of the foreign body, and endeavour to remove it, either by the mouth or by an œsophagotomy. The symptoms becoming worse, I was again summoned at two o'clock, and was met by my colleagues, Sir W. Stokes, Mr. Thornley Stoker, and Mr. Corley. We determined at once to tracheotomise the patient, and this was done without an anæsthetic. The operation was difficult because of the great inflation of the cellular tissues, and the trachea lay at a great depth. The opening of the tube,

however, was effected satisfactorily, and the patient described himself as greatly relieved. But he had suffered so much, that we agreed not to make an œsophageal exploration then, but to wait until the next day, as his urgent symptoms were fully relieved. Next morning he told me that he had passed a very good night, that his breathing was no longer troublesome, and that the mass had passed down his œsophagus all right. As a proof of this, he said he had felt some pain while sipping a little water, and that he could feel the mass passing on to his stomach, that after that he could swallow fluids perfectly, that he had, in fact, taken half a pint of beef-tea during the night, and that he had had tea for breakfast. He said he felt very well, and I need not say I did not then propose any exploration of the œsophagus. During the day he was very well, but towards midnight he became weak; the weakness increased, and he died at half past two on the morning of the 27th September—about forty hours after I had first seen him.

The *post-mortem* examination was made a few hours later. It was then found that in the posterior mediastinum there was over a pint of fluid, which was made up apparently of tea and beef-tea, and that this had dissected up the pleura, which was bulged forwards. It is probable that the pain which the patient suffered, and which he regarded as due to the passing downwards of the beef-tea, was really caused by the forcing of the pleura from its attachments by the fluids which had escaped from the œsophagus. An examination of the air-passages and of the œsophagus was next made. The glottis appeared normal; there were no symptoms of inflammatory swelling or infiltration; the opening in the trachea involved the upper tracheal rings and the cricoid cartilage. On examination of the œsophagus a mass of beef and fat, extending for a length of about two inches, was found tightly fixed in the upper part of the tube; the upper surface of this mass corresponded to the level of the cricoid cartilage. Projecting through the œsophagus was found a small bone about the bulk of a crow-quill, 4 cm. in length, and with very sharp ends; its position was oblique from behind forwards, so that its anterior extremity, which projected about 1 cm. through the œsophageal wall, lay on the

outside of the left wall of the trachea; the posterior extremity projected about ½ cm., and lay on the inferior margin of an oval slit or tear of 1 cm. in length. It was through this opening that the fluids had slowly passed out of the œsophagus, and had found their way downwards in the direction of the cardiac end of the stomach. If you examine the parts you will see that the bone serves for the glass rod which is used in putting up preparations in spirit, and that the beef is suspended from it like an ordinary morbid specimen.

The complete transfixion of both walls of the œsophagus from within is a very rare accident, and on all occasions, so far as I have been able find up to the present, such cases have been fatal. It does not appear that the injury in itself should be necessarily fatal, but it leads to complications of various kinds which deprive the patient of life.

Of the cases in which a foreign body has perforated the œsophagus, it has sometimes made its way outwards, and been found in the cavity of an abscess in the neck. Others, however, have done irretrievable damage by the wounding of large vessels. Poulet has collected 33 cases of this accident—17 were wounds of the aorta, 4 of the carotid, 2 of vena cava, 1 of the inferior thyroid, 1 of the right coronary vein, 1 of the demi-ayzgos vein, 1 of an abnormal right subclavian, 1 of œsophageal arteries, 4 of unknown arteries, and 1 of pulmonary.

In the "Dublin Hospital Reports," Vol. II., 1818, the late Mr. Kirby records a remarkable case of a woman who was brought to hospital in an almost lifeless condition, having been found in the street. Tracheotomy was immediately performed, but without effect. Three large morsels of food were found in the œsophagus, the upper being immediately behind the cricoid cartilage. The inferior lay as low down as the upper extremity of the sternum; this morsel contained a piece of bone an inch and a half long, one of its ends being very sharp and pointed. The bone lay obliquely across, transfixing the œsophagus at its left and posterior part, and wounding the right subclavian artery, which, contrary to its usual course and origin, lay in this situation as it passed from the left of

the arch of the aorta, where it arose, towards the right shoulder. The surrounding cellular membrane was filled with blood, which accumulated principally at the sides of the neck. In the Dupuytren Museum there is preserved a specimen of a case of Pilate's, in which a fragment of bone such as this perforated the inferior thyroid artery, and caused death.

The condition of emphysema as a primary complication is excessively rare, except in cases in which the trachea has been perforated. Poulet remarks that he has only met with one example in which it assumed disquieting proportions from the beginning. In my case there is no wound of the trachea, and I believe the condition to have been set up by the convulsive efforts of the patient to breathe, so forcing the air through the wounds in the œsophagus into the cellular tissues in the neighbourhood, whence it found its way upwards into the neck, face, and orbits.

An interesting question here arises—did the surgical interference produce the perforation? It will be seen that the fragment of bone is of greater length than the diameter of the mass of beef which is suspended from it; therefore its tendency must have been to a more or less horizontal position, and it is quite clear that the action of the œsophagus must sooner or later have produced its own perforation—but it is no less clear that any attempt to force the bolus downwards must have resulted in this accident. Yet I think it right to say that I acquit the operator of all blame, because I believe that even an attempt at exploration would probably have had the same result.

Now with regard to my own treatment of the case, it will be of interest to discuss whether I did the best for my patient. I can only say that all the possibilities were most anxiously debated, and that my colleagues and myself were unanimous as to what was done. It was plain to us that the patient was dying, not of the obstruction in his œsophagus, but of the spasm set up in his larynx from the irritation of the pneumo-gastric nerve by the foreign body, and it was obvious that our first duty was to relieve the dyspnœa.

But let us suppose that I had succeeded in determining by

examination that the bone was in the œsophagus, I should certainly have tried to extract it by forceps, and I should as certainly have increased the lacerations which were already made. The course which we determined upon was, I submit, the right one, because it removed threatening death and gave opportunity for more deliberate treatment. If the patient had survived sufficiently long the operation of œsophagotomy would have been undertaken, and yet, having regard to the great extravasation of foreign fluids in the posterior mediastinum, the result must have been necessarily fatal.

I have ventured to record this case at some length, because we are not unaccustomed to instances of foreign body in the œsophagus, and because I think that such a history tends to show that there is none of them which may be lightly regarded, unless, indeed, we are quite assured of the nature of the material which has become impacted. Above all, it impresses the importance of gentleness in our manipulations in this region, and of the necessity not only of determining the quality, but also the exact position of the offending substance.

ON THE TREATMENT OF ADVANCED CONDITIONS OF EQUINO-VARUS.

By R. L. SWAN, F.R.C.S.;
Surgeon to the Orthopædic Hospital.

[Read in the Section of Surgery, January 10, 1888.]

I do not bring before the Surgical Section of the Royal Academy of Medicine the subject of the treatment of club-foot without feeling that I run the risk of wearying its members by a too familiar theme—"a twice-told tale." My explanation will be that in a somewhat large experience of that deformity I have learned some practical facts in its management which may have escaped the observation of those who have not devoted a continued attention to this ailment.

I do not now refer to the scientific and recognised treatment of congenital equino-varus. That, I conceive, is universally understood and practised, if the surgeon have the opportunity of practising it, which, however, from many reasons he is frequently denied. It can, I have no doubt, be positively asserted that all cases of congenital equino-varus are perfectly curable by this method, if it be thoroughly carried out before the expiration of the first year of life, or before the effort to walk has commenced, always subject to the accident of relapse, which will occur in a lesser or greater degree if extension and natural position be not maintained for about five years. So invariable a result of a too-frequent neglect explains how it is that the best efforts of the surgeon are wasted; and it is a striking fact that when the parents of children so afflicted are either possessed of sufficient means or culture to enable or impel them to devote close attention to such cases, the result is invariably good.

Amongst the poor a different state of things is seen. The child, on leaving hospital, may for a short time receive some care. Then

the parents, perhaps "steeped in poverty to the very lips," perhaps from intemperance, or from careless or degraded natures, discard all appliances and all trouble. The child walks about unheeded, and after a period of neglect extending over few or many years, is brought by some sympathiser, or being old enough to feel "curtailed of fair proportion, deformed, unfinished," applies of himself to a new surgeon. In either case the old one does not escape censure, unless he be dead or forgotten.

We are now confronted with a class of cases of equino-varus which present difficulties of a serious character. It is true that if we meet with a foot that has been only walked upon for a short time, we may still, by tenotomy and the division of other resisting soft structures, effect a cure, but the treatment will be very much prolonged, and its duration may be estimated by months and not by weeks. But as time goes on, and the child has been for years walking on the outer edge of the foot, it is well to inquire, What are the conditions that exist? and what hopes can be entertained of a cure? We find there is a partial luxation of the proximal extremity of the 5th metatarsal bone, whereby its shaft is deflected inwards; at the same time, the relations of the os calcis and cuboid are altered, so that the cuboid bone bears an abnormally large proportion to the outer edge of the foot; the integument on the new heel is thickened, and a bursa is present. Now, in this state of things, I have learned to distrust my own power of attaining a good result by ordinary methods. Much can doubtless be done by the immediate treatment of the surgeon and by subsequent boundless care, but regarding the hopelessness, in the class of persons to whom I have alluded, of such being bestowed, one is disposed to say, "Truly, the name of the slough is Despond."

When the conditions so exist, there is, I believe, a small chance of a good result by tenotomy and extension, and another and more severe method of treatment must be adopted if a termination satisfactory to the patient and the surgeon is to be gained. The merit of first clearly seeing this belongs to Mr. Davy, who removed the cuboid bone in aggravated equino-varus of long standing. In the year 1876, with the concurrence of Professor Hamilton and

Fig. 1.

Case in which operation is inadmissible.

Fig. 2

Case favourable for operation.

Fig. 3

Lines denoting section through bones of foot.

DR. R. L. SWAN ON THE TREATMENT OF ADVANCED CONDITIONS OF EQUINO-VARUS.

Falconer Dublin

Fig. 4

T. B. before operation.

Fig. 5

T. B., showing hollow claw foot one year after operation.

DR R. L. SWAN ON THE TREATMENT OF ADVANCED CONDITIONS OF EQUINO-VARUS

Falconer, Dublin

Dr. M'Donnell, I removed a wedge from each foot of a girl aged thirteen, the subject of equino-varus, with a good result. Some time afterwards I learned that Mr. Colley had adopted the same method. But this question of priority is of little importance. There are in surgery no patent rights to be infringed. He who follows and observes intelligently, learns from the successes and from the failures of his predecessor.

The selection of cases suitable to this operation will next demand our attention. Speaking to a body of gentlemen who are anatomists, I need hardly say that the ossification of the tarsal bones is in theory singularly unfavourable to the rectification of equino-varus. The first bone after the astragalus which begins to ossify is the cuboid, and this at birth. At the end of the first year we find ossification advanced in the external cuneiform bone. Between the ages of three and four years ossification has advanced in the middle cuneiform and scaphoid bones. Let it be granted, however, that all cases under three and a half or four years may be excluded from consideration. From that period till the tenth or twelfth year a gradually decreasing amount of improvement will be attained by the practice of tenotomy and extension, each case having to be judged on its own demerits. When a fair prospect of success appears probable—that is, when the osseous changes are not strongly marked, and where a certain amount of mobility in the tarsal articulations is perceived, the practice here should be, I think, to proceed with the more mild and safe treatment, and if the result be not satisfactory, to recommend ablation of portion of the tarsus.

At a more advanced period, from the tenth or twelfth to the twentieth year, new features are presented. Here we find the tarsal bones apparently thickened, the large bursa on the outer tarsal aspect is dense, and includes in its base the cuboid and the tarsal end of the 5th metatarsal bone, and may extend to a greater or less degree on the dorsum of the foot. There may be varieties in the existing conditions—in one case there is considerable mobility between the tarsal bones, in another a marked rigidity exists, and the entire tarsus moves *en masse* at the ankle-joint on manipulation. The weight of the body, instead of passing vertically to the astragalus,

is transmitted obliquely through a line passing from its superior and internal to its inferior and external margins. The head of the bone is twisted inwards. The 5th metatarsal bone is not alone deflected inwards, but forms a distinct curve, which may easily be demonstrated in the living subject. In addition, the changes in the soft parts are marked. The space between the inner malleolus and tendo-Achillis is diminished; also that between the inner malleolus and heel. The plantar fascia is tightly contracted.

In such instances there can be no other resource, if treatment be at all attempted, than removal of a portion of the tarsal bones, and the results, in my experience, justify this procedure, even in cases long considered hopeless.

There is a condition which I have often observed, and which has decided me not to recommend operation—that is, an atrophied state of the anterior part of the foot. This is invariably seen in examining a person in middle life the subject of equino-varus, and sometimes at an earlier age. It is hard to conceive how such a foot could be useful, even if the sole were approximated to the ground.

The operation is a very simple one. The limb having been Esmarched, a horizontal incision is made parallel to the outer edge of the foot extending from the middle of the cuboid forwards over the 5th metatarsal bone; another is made at right angles to this from its centre, more or less long as necessity will arise. This will display a couple of outer slips of the extensor longus digitorum, which are displaced inwards. The peronæus tertius and the muscular part of the extensor brevis digitorum, are also seen. The bursa is displayed. This may be dissected out. The bony wedge may now be removed. In a young subject a strong knife and sharp chisel, used by the hand, may suffice, and a clean cut may thus be made. At a more advanced age, Hey's saw, or the use of the mallet with the osteotome, will be necessary. One or two vessels, at most, require ligature. There is a redundancy of thickened integument which may partially be removed. The surfaces may now be approximated. It will generally be found that, in order to obtain accurate apposition, a piece of bone will still require to be

removed from the apex of the conical vacuum. The integuments are then sutured, and an opening is left at the junction of the two incisions for drainage.

The necessity of firm apposition and immobility of the parts is obvious. I have tried a variety of expedients to secure these conditions, but have discarded all—save one, the simplest and, I believe, the most efficient.

Having dressed the wound with antiseptic precautions, the foot is given to the care of an assistant, who maintains correct position. A carbolised sponge, or one of Borrough's antiseptic pads, is placed over the dressings; a plaster of Paris bandage is then carefully applied over all and position maintained until it has set. The foot is not then disturbed for some time. The capsule of Eucalyptine or Thymol in the pad may be ruptured on the third or fourth day by a little pressure.

On the sixth day, if the temperature or other symptoms do not previously indicate mischief, a window is cut over the pad. The wound is easily approached, and has never, in my experience, given any trouble till firm union is established. The division of the tendo-Achillis and the application of a Scarpa's shoe or other appliance is usually necessary to gain complete rectification.

On examining the wedge which has been removed, and of which a good example is here seen, taken from a boy eighteen and a half years old, it will be found to consist of the anterior $\frac{3}{4}$th of the cuboid bone, all the external cuneiform except its posterior part, the proximal extremities of the 5th, 4th, and 3rd metatarsal bones in decreasing amount. The second part removed will consist of a portion of the middle cuneiform.

The soft parts removed will be the muscular portion of the extensor digitorum brevis, the two outer tendons of the extensor digitorum longus, the Peronei tendons, portions of the 2nd and 3rd plantar, and 3rd and 4th dorsal interossei. I have lately had the opportunity of seeing a case which was operated on nearly two and a half years ago. The boy was then six and a half years old. He was exhibited at the last meeting of this Section. These are the casts taken of his foot before and two and a half years after

operation. Perhaps some present may recollect the case. There was a surprising mobility and good use of the foot, and I examined this with other cases very carefully to account for such favourable conditions. It will be seen, if the lines of bony section be traced, that the transverse tarsal joint, between the calcis and cuboid, astragalus and scaphoid, is uninjured; likewise the articulation between the scaphoid and cuneiform bones. An obliteration occurs, therefore, only of the joints between the three outer metatarsal bones and the external cuneiform and cuboid, in which the normal motion is limited. It may, in addition, be fairly hoped that the development of the foot will not be very much interfered with, as the metatarsal bones have their epiphyses at the distal end.

The case of T. B, aged ten years, here illustrated, is of interest as bearing out the pathology of hollow claw foot as described by Duchenne. Though a very useful and comparatively symmetrical member, it displays the characters of that affection. The mechanical interference with the functions of the interossei would probably explain it.

I have up to this period selected 34 individuals as proper subjects for the performance of this operation. The youngest was four and a half, the eldest was eighteen and a half years of age. Of these 19 had one foot affected. The remaining 15 had double equino-varus. As in all cases where operation is not a necessity to save life, "slow pausing caution" is essential, and more especially where the marginal line is approached, where tolerable comfort and symmetry may be obtained by a less severe method, but the facility and the immunity from risk by careful dressing, and above all, excellent results, may, I think, justify in suitable cases its universal adoption.

> "Diseases desperate grown,
> By desperate appliance are relieved,
> Or not at all."

SURGERY OF THE THYROID GLAND.

By GEORGE FOY, F.R.C.S.;
Surgeon to the Whitworth Hospital, Drumcondra.

[Read in the Section of Surgery, January 20, 1888.]

In reading the history of operations on the thyroid, nothing is more apparent than that surgeons, separated by long intervals of time, adopt the same precautions to minimise the dangers of the operations. Thus we find Mr. P. H. Watson (*Ed. Med. Journal*, Sept., 1873) adopting the same method as Desault did on a woman patient in the Hôtel Dieu, 20th March, 1791—namely, tying the superior and inferior thyroid arteries, and dividing the isthmus of the gland, as the preliminary steps of the operation of excision.

From the great vascularity of the thyroid, surgeons were anxious to substitute operations other than cutting ones for the treatment of bronchocele. And since Professor Victor Horsley's Brown lectures in December, 1884, telling that ablation of the thyroid caused atrophic changes in the central nervous system, and an increase in the general connective tissue, with a mucoid degeneration of the ground substance, the search for a remedy that will do away with the necessity for using the knife is not slackened.

It would be unprofitable to enumerate the many remedies that have been tried, and as we are yet a long way from the time when the knife can be laid aside, our search had better be for its more efficient use.

Delay in performing an operation when it has become necessary is criminal, and we cannot too strongly deprecate the habit of exhausting a long list of supposed remedies before an operation is advised.

An early operation for a tumour gives the surgeon the best possible chance of success, and his success means the patient's

recovery. The tumour is then at its smallest; has least attachments; degeneration is less likely than later on; the blood-vessels are smaller than they would be if the operation is deferred, and the surrounding tissues are normal in their condition and site. These grounds for an early operation are particularly good in the case of thyroid tumours, where the vascular growth is quick beyond proportion to the tumour growth.

In thyroid operations the older surgeons knew almost no risk, except bleeding, the excessive amount of which may, I think, be fairly ascribed to a paralysis of function of the vaso-motor nerves and an imperfect contraction and retraction of divided arteries—these latter conditions probably due to some alteration in the arterial coats.

Certainly in goitre the amount of blood lost appears out of proportion to the size of the vessels cut.

It is true there was some dread of thyroid inflammation, and enlargement of the mediastinal glands; but the greatest risk was that of hæmorrhage. Abraham Colles, writing in 1811, says:—"That enlargement of the thyroid gland called goitre we know to be but little affected by any medicines or external applications hitherto employed. This disease, though not of a painful nature, yet induces such deformity as to render the mind of the patient miserable. He sometimes implores the surgeon to undertake any operation however hazardous for his relief. But to such solicitations nothing should tempt you to yield, for you should recollect the large supplies of blood that this gland enjoys, even in its healthy state, and the free communication between its arteries."

Even John Bell disapproved of operations on the gland on this account.

On the Continent the same dread did not exist, though Gooch, who followed Desault's method, lost his first patient by hæmorrhage, and his second was saved only by the continuous pressure for eight days of the hands of relays of assistants. Hedanus, of Dresden, who successfully extirpated six thyroids, found bleeding the principal difficulty, and one of his cases had secondary bleeding on the eighth day, with a recurrence of it on the sixteenth. Klein (in

1820) lost a patient, aged eleven years, from the same cause. He actually died on the operating table. The danger from bleeding is still very great. Sir William MacCormac has recently had to apply 100 ligatures when removing a tumour of the thyroid. But excessive bleeding is not the sole danger. Billroth writes of a case in which he removed a tumour the size of a hen's egg immovably connected with the trachea:—"I extirpated the tumour, and found the operation one of the most difficult I ever performed. There was great difficulty in separating the tumour from the trachea and the deeper parts; the hæmorrhage was very severe, and attacks of suffocation occurred, and she seemed several times during the operation on the point of death from asphyxia."

Cystic tumours of the gland are difficult to diagnosticate. Syme is credited with mistaking one for a carotid aneurysm. He tells of a lady who "had a lobe of the thyroid enlarged into a round tumour with such a narrow neck as to appear altogether insulated;" but in the removal of which such severe bleeding occurred that he had to transfix the base with pins according to Liston's method, and ligature the base as recommended by Hedanus.

Cysts sometimes rapidly increase in size. A case is reported in the *British Medical Journal* of July 5th, 1884, in which, within a few minutes, a cyst suddenly increased in size from that of a walnut to that of an orange. The patient became senseless and livid. Owing to the position and size of the tumour tracheotomy could not be performed, and the patient died. The autopsy showed that the sudden enlargement was due to effusion of blood. In Labbé's case the cyst suppurated, occasioning much pain and annoyance to the patient.

Although myxœdema and cerebral troubles occur after excision of the gland, yet they are not reported as following the removal of a tumour.

Cysts are amongst the most common enlargements of the gland, and it is for them especially that so many minor operations are recommended, and such a list of internal remedies and external applications produced, and very frequently valuable time is wasted in abortive attempts to effect a cure without recourse to the knife.

Yet many conscientious practitioners, who have had occasion to try tapping, setons, and soforth, do not recommend them.

In the beginning of August, 1885, I examined a cystic tumour which certainly looked a suitable case for tapping or some such operation, and yet something caused me to decide for its excision. I like to see what I am doing, and I like to see what I am cutting.

The patient—a young married woman, the mother of three children—complained of a lump in the front of her throat. She first noticed it about twelve months previously, when it was about the size of a hazel-nut; latterly it has been growing very quickly. She complains of dyspnœa and dysphagia, and going upstairs distresses her.

On examination an oval tumour was seen situated in the right lobe of the thyroid gland. It moved vertically with the gland, and had a slight lateral movement. The skin over the tumour was unaffected, and freely movable. Having plainly placed all the risks of an operation before the patient, her husband, and mother, and receiving their full approval to its being done, I, on the 26th of August, commenced the operation. The patient being anæsthetised by Dr. Cosgrave, I was further assisted by Drs. Wharton, Oulton, Wynne, and Wm. Montgomery.

The primary incision extended from the hyoid bone to the sternum, and the thyroid was quickly exposed—bleeding vessels being secured with catch-forceps as the operation proceeded. Liberated from pressure, the tumour bulged into the wound, and appeared as an opaque, oval mass, larger than a hen-egg, enclosed in a thin, fibrous capsule. So far everything was most favourable—the patient was breathing easily, and the pulse was regular. A slight incision in the capsule exposed the tumour, and breaking down a few adhesions with my finger I lifted the tumour with my hand from its bed. Scarcely had it been removed when a copious rush of blood followed. Almost immediately six vessels were caught with clip forceps, and a bunch of vessels which were spouting blood, were caught in one mass by a broad pile forceps—yet no appreciable check was given to the flow of blood. So freely was the blood coming that some of those present imagined that

the principal vessels of the neck were injured. Believing that any further attempt to seize the bleeding vessels one by one would lose valuable time, and seriously endanger the patient's life, I, with the approval of those present, plugged the wound with new sponges, and to retain them in position and keep up continuous pressure, I passed four long and strong entomological pins across the wound from side to side, and lapped strong whipcord in figure-of-eight coils from pin to pin in a similar way to that in which hare-lip pins are secured in place.

On the second day the forceps were removed, and three days afterwards the sponges.

Whilst dressing the wound I counted thirty-eight vessels, which were evidently prevented from retracting by the fibrous envelope; they were principally branches of the superior thyroid, and entered the tumour on its posterior surface.

Porter recommends opening the capsule, as by so doing you are less liable to hæmorrhage; but from the case narrated, I think the capsule, when retained, holds the same arteries in position, and prevents retraction.

The wound was dressed by wiping with fresh cotton wool, and afterwards dusting with iodoform; this latter had, however, to be discontinued, owing to its purging and griping the patient. One month after the operation the lady returned to her home in one of the midland counties in England.

Internal medication and external applications in the case narrated, had they been tried, would have wasted valuable time without any reasonable good results.

Tapping would have evacuated the contents of the tumour, but it is highly probable that it would have been followed by an uncontrollable hæmorrhage. And with the knowledge of the tumour acquired from the operation, I still am of opinion that the best course for the patient was excision, and the successful issue of the operation in great part confirms the decision.

ON A CASE OF EPIDURAL HÆMORRHAGE TREATED BY SECONDARY TREPHINING.

By WILLIAM THORNLEY STOKER,
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[Read in the Section of Surgery, February 24, 1888.]

On Thursday, 16th June, 1887, a labourer, named Patrick Rourke, aged about fifty, of robust habit and sanguine temperament, was received into the Richmond Hospital. He was reported to have been drinking heavily up to the Sunday previous to his admission, and on that day to have fallen off a cart and sustained such injury that he became insensible. No accurate history of his condition between the Sunday and Thursday could be obtained, nor any hint as to whether his fall was the result of previous loss of consciousness, or his loss of consciousness incident on his fall. The possibility of violence having been used was present, and was supported by the apparent disinclination of those who had been in contact with him to give information. The most we could gather of his condition during the interval between his injury and his admission to hospital was that he had been more or less stupid, and apparently suffering from the effects of his previous debauch.

This absence of any reliable history complicated the difficulties of the case, and was one of the reasons why operation was delayed so long.

At the time he came under observation, on the fourth day after the accident, his condition was as follows:—He was in a state of stupor, from which he could be easily aroused, when he made slow but sufficiently intelligent answers. His pupils were of average size, symmetrical, and fairly responsive. He had very slight

partial paralysis of his left facial nerve, with the usual protrusion of the tongue to that side; there was partial motor paralysis of the left arm, and a barely detectible motor insufficiency of the left lower extremity. He swallowed well, and his speech, though thick, was quite intelligible. There was no sensory paralysis.

On his head being shaved and examined, a bruise was found on the right side of the cranium, 25 mm. from the mesial line, on that part of the scalp which would correspond to the upper part of the fissure of Rolando. It was about 20 mm. in diameter and indurated round the edge, so that it was not possible to say whether a depressed fracture existed, or merely a ring of hardened blood-clot. In consultation it was determined to delay operative treatment pending the persistence or farther development of symptoms, as there was not sufficient evidence as to whether the cerebral pressure present might not be apoplectic.

On the next day there was but little change, except that stupor was more marked; but on that following, the sixth after the fall, there was considerable change for the worse. He could with great difficulty be aroused. The breathing was stertorous. The right pupil was slightly larger than the left. The paralysis of the left arm was nearly complete, while that of the lower extremity, though incomplete, was more evident than at first.

On the next day, June 19, the seventh of the case, his condition was rather improved; but on the night of the eighth day he got rapidly worse, and when I visited him on the morning of the ninth day after the accident his state was as follows:—The face and extremities of the left side and the bladder were completely paralysed. The pupils were symmetrical, and, without being actually dilated, were rather over medium size. He was in a state of profound coma, and the automatic act of swallowing was performed in the case of small quantities of fluid with marked slowness and imperfection. The breathing was slow, 12 to 14 in the minute, and was stertorous and diaphragmatic. The temperature, which had previously been at or about the normal point, except on the sixth day, when it went up to 100°, had fallen to 98°; and the pulse, which had for some days been gradually

increasing in frequency, had risen to 110. The man was evidently failing rapidly, and would die soon if unrelieved.

Looking at the entire view of the case, in spite of its obscure history, I came to the conclusion that the symptoms were probably due to hæmorrhage between the bone and dura mater, dependent on a laceration, with or without fracture, of the middle meningeal artery. Although there had been, so far as we could ascertain, no complete recovery between the injury and the advent of the later symptoms of pressure, and therefore an absence of that interval which is so characteristic of subcranial hæmorrhage, yet, on the other hand, there had not been that even level of ills, or that uniformly downward path of symptoms, indicative of laceration or apoplectic pressure on the brain.

The reading of the case, as expressed at the time, and fully borne out by its subsequent history, was this:—

1. Hæmorrhage over the right motor area, between the bone and dura mater, probably due to laceration of the middle meningeal artery or one of its branches, most likely associated with fracture, and producing the partial left paralysis which at first existed.

2. Subsequent increase of the hemiplegia, either due to renewed hæmorrhage, or to that sudden yielding of brain function which is repeatedly seen both in hæmorrhages or serous effusions which have existed for some time, even though no additional mechanical pressure is called into play.

Let us examine the reasons for these conclusions.

The existence of the scalp injury over the upper and back part of the motor area was of less value in indicating the seat of pressure than the opposite paralyses, which pointed clearly to the engagement of the greater portion of the right motor area, including the extensive surface occupied by the cortical centres for the various parts of the upper extremity, the face and tongue, and lower extremity, the interference with them being in the sequence in which they are written. Remember, in this context, the statement of MM. Charcot and Pitres ("Revue de Médecine," October, 1883), more lately repeated and endorsed by Ferrier, that "there does not exist a single accurate observation of a destructive

lesion outside the motor area having produced permanent paralysis; nor does there exist a single accurate observation of a destructive lesion of any extent of the ascending convolutions which has not given rise to permanent paralysis of the opposite side of the body."

The dilatation of the pupil on the same side as the cerebral lesion is the condition most usually found, and the disappearance of the mydriasis when the other pressure symptoms became aggravated is but an example of that compensation derived from the centres of the opposite hemisphere, as shown by the law of Broadbent, which teaches that "one-sided movements are represented in both hemispheres, and can be excited from either, in proportion as they are habitually associated on the two sides" (Gowers). The eyes have an intimate association of action which would cause this rule to apply to them more strongly than to other parts.

As to the assumption that the pressure was cortical, and not apoplectic, it was founded on my belief in the absence of any sensory paralysis, and the teaching on that point, so well expressed by Ferrier, who says that—"Strictly cortical lesions of the motor area do not cause anæsthesia in any form, and it may be laid down as a rule, to which there are no exceptions, that if anæsthesia is found along with motor paralysis, the lesion is not limited to the motor zone, but implicates also, organically or functionally the sensory tracts of the internal capsule or the centres to which they are distributed." The cortical nature of the pressure was farther supported by the existence in the early stage of the case of a pronounced brachial monoplegia, as it is well established that monoplegia is a condition due to interference with the cortex and not usually found in more deeply situated lesions.

The impeded functions of the respiratory centre and pneumogastric nerve, as evidenced by the increasing rapidity of pulse, the diminishing frequency of respiration, and the extreme difficulty of swallowing, were believed to be due to pressure on the medulla from above, rather than to any direct blood-pressure on the origins of the nerve, as if blood had found its way so far as the undersurface of the medulla it would most likely have penetrated to the spinal canal and so relieved its pressure effect on the pneumogastric

origins; besides, the late and gradual advent of the pneumogastric symptoms was more likely due to cumulative pressure from above than to so late a secondary hæmorrhage as this should be were it the direct cause of pressure, remembering that the medullary impediments did not exhibit themselves until the ninth day after the injury. This was rather an important point in determining operation, as a surgeon would naturally be slow to use the trephine if he believed basic extravasation to have taken place.

Considering the whole story of the case, and in view of the inevitable death of the patient if not relieved by treatment, it was determined to trephine him. This was done on the 21st of June, the day on which he exhibited the pronounced conditions just described, and the ninth after his accident.

The patient was completely comatose, and no anæsthetic was used. The injury over the fissure of Rolando was taken as the point indicated for operation, because, although not in the centre of the engaged portion of the motor area, a possible fracture existed there. Two incisions were made, one downwards and outwards behind it, the other running horizontally forward, so as to include a rectangular flap. The scalp and pericranium were raised together, and the bone was found to be free from any appearance of injury. A trephine, with a diameter of 26 mm., was applied, and on the disc of bone being removed, the antero-inferior edge of the opening disclosed the edge of a well-formed blood-clot, evidently reaching downwards and forwards over the parietal area. The incisions were extended, so that each measured 60 mm., and a second trephine opening was made immediately below and in front of the first. The projecting tongues of bone between the two openings, which ran into each other, were then cut off with a bone-forceps, and an oval opening measuring 52 mm., rendered available for removing the clot. This was effected by the director, the finger, and a current of sublimate solution, and a cavity between the bone and dura mater remained, which was circular in outline, covered all that portion of the motor area which lay anterior and inferior to the trephine hole, and was at least 90 mm. in diameter; at its centre the clot was so thick that the dura mater was distant from

the cranium about 40 mm. When this stage of the operation was completed, the dura mater began to rise towards the cranial wall, so that when the wound was sutured it was within 6 or 7 mm. of it. Signs of returning brain power at once showed themselves, and before the patient was taken off the operating table he moved his left arm and leg with tolerable freedom, asked for a drink of water, which he readily swallowed, and gave vent to some rather bad language.

Some little oozing of fresh blood took place, but gave no trouble. Strict antiseptic measures were observed; the solutions were of corrosive sublimate, 1 in 3,000, and the spray carbolic acid. The wound was sutured, except at its angle, where a drainage tube was inserted, and dressed with sublimated gauze and iodoform cotton. The dressing was changed daily, the drainage tube removed on the third day after operation, and the sutures on the fourth. An uninterrupted good recovery was made. Pus appeared freely on the sixth day, but without any odour, and continued to be discharged for two weeks longer, when the discharge ceased, and the wound closed. The temperature, which was 98° on the morning of operation, rose on four occasions during the ensuing ten days to 100°, but for the rest of the time the man was under treatment it was practically normal. On the evening of the day of operation the paralysis and brain symptoms had all but disappeared, and he could pass water voluntarily. A day later he was in a perfectly normal condition as regards any brain symptoms. He was kept under observation until September 29th, when he left hospital. He again presented himself on November 10th, when he had a sinus discharging at the angle of the original wound. I received him into hospital, and the next day removed a small fragment of bone from the trephine hole. It had evidently been separated from the inner table, and showed clearly from its form that a fracture of the vitreous table had existed. The sinus has since continued to discharge a gradually diminishing amount of pus, but I cannot find denuded bone, and his excellent general health is in no way impaired.

If another case, resembling this in the extensive separation of

the dura mater from the bone, offers itself for treatment, I shall be disposed to make one addition to the methods here employed. That is, if a drain should be necessary, I will consider the propriety of making it as efficient as possible by forming a small trephine opening at the nearest accessible point to the lower edge of the line of separation between the cranium and dura mater. The more perfect drainage thus afforded would, I believe, promote the healing of the cavity and lessen the risks of suppuration, by offering a free and depending exit to pus or any other fluid present.

This case has some features of great interest. Not the least among these is the lesson it teaches as to possibility of making an accurate diagnosis, even in an instance so obscured by want of definite history as this was. There is nothing more clear than the justice with which Mr. Hutchinson, in his "Lectures at the London Hospital," points to the enormous difficulty which often exists in distinguishing compression from laceration of the brain due to one cause or another. I escaped this dilemma and was able to arrive at a conclusion justifying a useful operation by two circumstances—first, that I could, independent of any knowledge of a fracture enabling me to localise the hæmorrhage, put my finger over the motor area and say with sufficient accuracy, "there is pressure here over the cortical centres for the upper extremity; it extended downwards and forwards to those for the face; it afterwards reached upwards to those for the lower extremity." The sequence is anatomically perfect. First a brachial monoplegia; then, as the blood or pressure effect extends, a facio-lingual; and finally, a crural paralysis. Again, I was justified, using the knowledge of the fact that cortical lesions of the motor area do not cause anæsthesia in any form, and that no loss of sensation was present here at a time when the condition of the man permitted that fact to be tested, in assuming that the pressure was probably between the dura mater and bone; a decision to which I was farther helped by the monoplegic condition which at first was present. To what, I ask, do I owe the knowledge on which this judgment was founded? Largely to the humane and benevolent investigations of those biologists whom weak, credulous, or mistaken people are actively

pelting with the verbal filth of prejudice and ignorance—people who would prefer that this man, formed in the image of his Maker, should die, rather than their feeble sentiment be offended by a painless experiment on an ape!

Another point of interest is the very large size of the clot which was present, and the late development of the grave symptoms which were producing death. The clot was so uniform in colour and consistence that I am persuaded it was all the result of one primary or intermediate hæmorrhage, and that the failure of brain power on the ninth day was due, not to added pressure, but to the increased intravascular tension due to the vascular spasm produced by irritation of the sensory nerves or their centres, which, as Duret has shown, can destroy life before the amount of extravasation is reached which is capable by itself of producing a fatal disturbance of cerebral function.

As bearing on localisation of function, this case has an interest beyond the corroboration it affords to what is held concerning the seat of the cortical centres for the various parts of the upper extremity, and the situation of that facio-lingual area. It helps to prove what is generally believed as probable, that the centres for the leg do not extend behind the fissure of Rolando into the superior parietal lobule at the point indicated by Ferrier as No. 1 area. I have made the most careful measurements of this man's skull, both by the methods of Reid and Thane, and I am satisfied that the centre of the upper trephine hole covered exactly the superior part of the fissure of Rolando 25 mm. from the median line. If it be remembered that the clot was found to extend downwards and forwards from the lower margin of this opening, it will be at once seen that it did not at its postero-superior limit approach within 10 mm. of the anterior edge of the fissure, and that the superior parietal lobule could not have been directly engaged. If it be urged in answer to this that the pressure producing the effect might be remote, it may be replied that in this case the remote pressure effect, that on the medulla, which undoubtedly did exist, seemed to expend itself downwards in the direction of gravity, as might naturally be expected.

Independent of these points, the case, as one in which no defined bone lesion served to localize the hæmorrhage, belongs to a class sufficiently rare to deserve notice. If I required any other apology for presenting it at such length, I would have it in the words of so eminent a surgeon as Mr. Hutchinson, who says, speaking of instances of effusion of blood between the bone and dura mater—"These are especially important, because generally supposed to be capable of relief by treatment. Yet it is a remarkable fact that the modern annals of surgery do not, so far as I am aware, contain any cases in which life has been saved by trephining for this state of things" ("Clin. Lect. Lond. Hosp.," 1867–68). The present is but one of two instances which have come under my own notice. In the *Med. Press and Circular* of Dec. 17th, 1879, Mr. Thomson communicated the case of a child whom he had trephined in the Richmond Hospital during the early part of that year for primary subcranial hæmorrhage over the right parietal region, and who made an excellent recovery. There are others recorded, for I find in Ashhurst 40 cases collected, several of which have occurred within the last 20 years. Of these, 24 recovered and 16 died; 22 of the 40 were primary operations, and of these 8 proved fatal; 16 were secondary operations, and of these 8 recovered.

The lesson of this case has impressed itself deeply on my mind; for, in other practice as well as in my own, I have seen instances in which life might, as I now believe, have been saved by operation such as this. In one case in particular, where a trephine hole was made by one of my colleagues, it was proved afterwards that the opening barely escaped the discovery of a clot, which a greater knowledge of localisation than we then possessed, and a second perforation, would have enabled us to discover and remove, with the probable effect of saving life.

On a careful study of the light which modern investigation has thrown on the localisation of intracranial pressure, and the security which modern surgical methods have given to the operation of opening the cranium, and bearing my clinical observation of deaths from doubtful intracranial accidents in mind, I have come to this conclusion for future guidance—that *if I am in doubt I will operate;*

that whether I believe the blood to be subcranial or subdural, I will not, so long as evidence of such constitutional disease or local condition as points to apoplexy is absent, allow a patient to die without giving him the chance of escape from a fate which appears inevitable if the surgeon holds back. Why should we hesitate to open the dura mater even if the bleeding be arachnoid? Are not the numerous cases which exist, of recovery when the brain has been exposed and extensively lacerated, sufficient answer to the policy of hesitation?

ON TRAUMATIC SUBDURAL ABSCESS OF THE BRAIN.

By Sir WILLIAM STOKES, M.D., Ch.M., Univ. Dub.; F.R.C.S.;
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[Read in the Section of Surgery, February 24, 1888.]

A reference to the statistical records of Abercrombie, Sir William Gull, and Dr. Sutton, will furnish evidence that of cerebral abscesses the traumatic forms are those which occur with least frequency. Thus of eighty-six cases collected by them, only twenty resulted from injury, or less than one-fourth of the entire number. Of these the subdural are the rarest, and it is to this form that I desire particularly to invite attention.

Until comparatively recently cerebral abscess has been considered as a rule a necessarily fatal condition. Undoubtedly high authorities such as Abercrombie, Griesinger, Lebert, and other accurate and trustworthy observers regarded them as out of the range of practical medicine, and the fact that this hitherto hopeless condition has of late to so great an extent been rescued from the confessed impotence of medicine, must be regarded as not the least among the modern triumphs of surgery. Two circumstances have doubtless conduced to bring about this desirable result; one, the greater knowledge that has been recently acquired of the localisation of cerebral function, injury and disease, and the other, the application of the principle of antisepticism, which deprives to so large an extent surgical operative interference of so many of its risks and dangers. The surgeons' hands are no longer, as was formerly the case, weakened and paralysed by the dread of meningeal or encephalic trouble resulting directly from the operation of trephining.

It must be admitted, I think, that the advantages to be derived

from trephining in cases of cerebral abscess are more likely to be conspicuous than when the operation is performed for other conditions causing pressure. I allude more particularly to those cases in which it is produced by some solid tumour or is hæmorrhagic in character. The facilities for localising abscess are as a rule greater than in these cases, and there is less risk of the subsequent occurrence of secondary complications at a period more or less remote from the time of the operation.

The cases of subdural traumatic cerebral abscess that have been operated on have been comparatively few. I have in fact only ascertained eleven such, operated on respectively by Dupuytren, Roux, Cæsar Hawkins, Rentz, Hulke, Sir J. Paget, Marshall, Lee, M'Ewen and myself. Of these eleven cases it is interesting and encouraging to note that in five the recovery was complete, in one there was recovery but with loss of sight and a subsequent tendency to epileptic seizures, leaving only five out of the eleven in which the operation was unattended with success.

The rarity with which the operation has been undertaken has, doubtless, to a large extent been due to the difficulties, now happily diminished, of localisation, and also to a lack of confidence in dealing surgically with such conditions which of late years we have obtained from a clearer and more thorough appreciation of antisepticism. In opposition to this, however, it may be said that perhaps the most brilliant instance on record of successful operative effort in a case of traumatic cerebral abscess occurred in the pre-antiseptic era. I allude to the case operated on by Dupuytren, whose bold interference, notwithstanding its successful issue, has been thoughtlessly described as reckless and hap-hazard. For example, Mr. Lawrence[a] observes, in reference to cerebral abscess, that "surgery, speaking through Sir A. Cooper and Sir B. Brodie, declares itself as impotent as medicine for the cure of such a malady, for although it is recorded that on one occasion Baron Dupuytren actually punctured the brain to the depth of an inch, after which the patient recovered, the result must be regarded more in the light of a specially lucky chance than as constituting a precedent which would warrant a like procedure

[a] Edinburgh Medical Journal, 1869.

in similar circumstances." Dupuytren's operation would in truth be more fittingly described as one suggested by a surgical genius such as few, if any, have ever before or since possessed.

In connection with the subject of cerebral abscess, the two following cases, which were under my care in the Richmond Surgical Hospital, are noteworthy examples; and the details connected with them, taken with the others to which I have already alluded, will, I trust, aid in arriving at some definite conclusions which possibly may guide us in our future appreciation and management of similar cases. The majority of them, I may mention in passing, are signally illustrative of the pathological fact, first noted by Dease, in reference to the usually late appearance of cerebral trouble after cranial traumatisms.

The first of these cases occurred in the autumn of 1869. The patient, a strong powerfully-built young man, aged twenty-six, was admitted into the Richmond Surgical Hospital, under my care, in September of that year. He had gone to the North of England during the summer to obtain employment at harvest operations, and during a dispute with some of his fellow-labourers, received a blow on the side of his head, over the left temple, with the handle of a reaping-hook. He was stunned by the blow, but soon recovered, and no other immediate bad consequence of the injury occurred. For some weeks after this he was able to continue his work, suffering from nothing but occasional headaches. He then returned to Ireland, and shortly after landing on the quay at the North Wall, got, it was said, a "weakness." He fell and became insensible. He was then brought at once to the Richmond Hospital, and I was promptly summoned. I found the patient in a state of complete insensibility; myosis extreme, and pulse slow. He had retention of urine; his respiration was not stertorous however, but the paralysis, motor and sensory, was complete. Shortly after his admission into hospital, assisted mainly by my friend the late Dr. Henry Curran, I trephined above and behind the left temple, at the situation of the cicatrix. On removing the bone there was a distinct bulging of the dura mater through the opening. I made an incision into it and evacuated about a drachm of clear straw-coloured serous fluid. There was no appearance, however, of pus, which was, I need hardly say, a source of great disappointment to me. It was remarkable,

however, that even the relief from pressure obtained by the trephining and evacuation of a small amount of serous fluid was sufficient to restore a certain amount of sensibility, as was evidenced on touching the conjunctiva. The operative measures I adopted in this case did not go any further, and the patient was removed to bed. The following day he died. At the autopsy an abscess containing fully two and a half or three ounces of healthy cream-coloured pus, and lying directly under the dura mater, was found situated immediately behind the situation where I trephined. Had I gone the twentieth of an inch further back I should unquestionably have opened the abscess.

This case, I need hardly observe, occurred in the pre-antiseptic and pre-aspiration era, and I had not the confidence that the one, and the assistance that the other now affords; but, persuaded as I was that I had to deal with a case of intracranial suppuration, it will ever be a source of regret to me that I desisted from the course to which I was instinctively prompted—viz., to make a second, or if necessary a third trephine opening. All the probabilities are that had I done so the matter would have been reached, and the patient's life possibly, indeed probably, saved.

In the following case the operation of trephining was attended with a more satisfactory result:—

John Brophy, aged twenty-four, by occupation a wall-plasterer, was admitted into the Richmond Surgical Hospital on July 29th, 1887. At the time of his admission he was in a heavy drowsy condition. Between six and seven weeks before his admission into hospital, he was, on a Saturday night, during a dispute with some companions, struck on the head with a poker. For a small scalp wound, which apparently was the only injury which resulted from the blow, he went to Jervis-street Hospital, where the wound was dressed. The patient was not detained in hospital, and on the following Monday morning went to work as usual. He continued at his employment uninterruptedly until July 17th, but for some days before this his appetite had been failing and he had been feeling rather sick and drowsy. He complained also of dizziness. On the night of the 17th he was attacked with vomiting, which continued off and on for a week. Shortly after this it was observed that he had considerable difficulty in speaking and making himself under-

stood. He was admitted into Hospital on July 29th, and his condition then was as follows:—There was a small wound not quite healed at the upper part of the forehead, about an inch to the left side of the mesial line. On passing a probe into this, denuded bone could be felt, and apparently a slight depression. The patient was extremely drowsy, and when sitting down at once fell asleep, but could be aroused by being spoken to in a loud voice. He answered, however, only in monosyllables, and could make no attempt at describing either what had happened to him or what he was suffering from. His pulse was 42; respiration and temperature normal; pupils even, but contracted. On the 31st his condition was much worse; he could only be roused with the greatest difficulty; his water was passed involuntarily, and paralysis in the extremities, both of motion and sensation, was well marked; his breathing, however, still remained normal, no evidence of stertor being in the slightest degree present. Power of deglutition, too, was found at this time to be lost, and as the day wore on, the stupor, from which it was found perfectly impossible to rouse him, became more intense. At 2 o'clock, p.m., he got a convulsive seizure, confined to the right side: the leg and arm were rigidly extended, and the hand was strongly clenched with the thumb turned under the fingers. These convulsive seizures lasted about three minutes, during which the pulse rose from 40 to 100, and the respirations became rapid, reaching 30 in the minute; the pupils contracted to pins' points; the cornea perfectly insensible, and the forehead bathed in perspiration. On the convulsion ceasing, it was found that it could be reinduced by tickling the soles of the feet, an experiment which was, in consequence, not repeated.

The case was clearly *in extremis*, and although I considered the chance of relieving the patient by operation was, under the circumstances, a remote one, I deemed it possible that relief might be afforded by trephining, and that the operation should be performed without delay. In this view I was strengthened by the coinciding opinions of my colleagues, Messrs. Thomson and Corley, who examined the case with me, and subsequently assisted at the operation.

At 5 30 p.m. I operated, and on raising a triangular flap of pericranium over the situation of the wound I found that there was no fracture with depression, but a small piece of the outer table of the bone was necrosed and completely detached. This, acting as a foreign body and source of irritation, had doubtless

prevented the external wound from closing. Having removed the detached fragment, I next applied the crown of a trephine so as to include the situation where the loosened piece of bone had been found. On raising the bone and exposing the dura mater no evidence of abscess was found. Feeling confident, however, I could not be far from the source of pressure, I punctured the dura mater with the needle of a hypodermic syringe, and passed it down for about the eighth of an inch, and on drawing up the piston of the instrument experienced disappointment at getting a negative result. I then passed the needle still deeper, and again failed to reach the matter. I was about to withdraw the instrument and abandon my efforts to relieve the patient, when, strengthened by the concurrence of my colleagues, I sank the needle down as far as it could go. On drawing up the piston once more I gladly perceived a few drops of pus in the glass receiver. I then freely opened the dura mater, and using the needle as my guide, I passed the blade of a narrow bistoury down to the abscess, some of the contents of which appeared soon at the surface of the wound. Acting on Mr. Thomson's suggestion, I got a piece of India rubber tubing, and passed one end down to the abscess, and attaching the other to the nozzle of a medium sized glass syringe, I succeeded in drawing or pumping up a quantity of dark coloured grumous pus. Of this I obtained one ounce and two drachms. I then filled a glass syringe with a one per cent. solution of carbolic acid, and thoroughly washed the abscess cavity, removing subsequently the carbolic solution by drawing it up in the way I done with the pus. A drainage tube being then left in, I replaced the flap, uniting the edges with numerous catgut sutures, and dressed the wound with sal-alembroth gauze and iodoform wool.

As regard the situation of the trephine opening, I may mention that it was three quarters of an inch to the left of the mesial line, and one inch in front of the coronal sutures. It corresponded to a point between the supero- and meso-frontal convolutions. In order to ascertain the size and direction of the abscess cavity I passed my left little finger into it; I could determine its limitation anteriorly, laterally, and inferiorly. Externally and inferiorly its limitation must have been formed by Broca's lobe, but posteriorly and inferiorly, although I passed my little finger as far as possible, its limit was not reached, and my belief, one shared in by Professor Cunningham, is that the abscess possibly involved the lateral ventricle.

The beneficial effects of the operation were almost immediate. His pulse from being 40 per minute rose to 120; he opened his eyes and looked about intelligently. After the wound was dressed he made an attempt to speak, and when asked if he felt better, answered, with tolerable distinctness, "Yes." In about half an hour I removed the patient to his ward, and for some hours he remained on his back quite quiet, the only disturbance being to make him take, from time to time, some warm milk, which we found him able to swallow without difficulty. Towards evening he turned on his side of his own accord and fell into a quiet sleep. In this condition I found him on making my visit between 9 and 10 p.m.

The next morning the patient was able to talk quite clearly and rationally; he passed water of his own accord. I dressed the wound, but did not remove the drainage tube; the patient's condition was in every way most satisfactory. On the day following, there being no discharge through the dressings, and the pulse and temperature being all that I could desire, I left the dressings undisturbed. The patient's bowels moved quite naturally. From this time the progress of the case towards recovery was uninterrupted. On August 6th I removed the drainage tube, the wound, except at the point where the tube had been, being completely healed.

On August 13th the patient was up and able to walk about the ward, free from all pain and feeling quite strong. Shortly after this I transferred him to the House of Rest at Merrion, where he remained for five weeks, at the end of which time he was able to return to his usual avocation. The final outcome of this remarkable case, if disappointing, is of much interest. For nearly nine months after the operation the patient remained perfectly well, and quite able to follow his usual occupation as a wall-plasterer. It was then stated that he got a "fit," from which he recovered, and he returned the following day to his work. The morning after this he was found in bed in a state of complete insensibility, and he was then brought for the second time to hospital. Right hemiplegia was complete, and both plantar and patellar reflexes were lost; his face was pale, but lips were deeply cyanosed. Pulse, 160; respiration, 60; temperature, 101·8°. He had frequent convulsive seizures after he came to hospital.

Thinking it possible that these symptoms might be due to the formation of a second abscess, I reflected the flap I made originally

at the trephining operation, and, on opening the dura mater, through some thickened cicatricial tissues, gave exit to a quantity of bloody serum; I then passed a blunt-pointed director downwards and backwards to a distance of 5 cms., but did not reach any pus or other fluid. A director was then passed downwards and slightly forwards, when a considerable quantity of serous fluid came gushing out. From this situation I removed six drachms of sero-sanguineous fluid, dotted with white-coloured flakes. The effect of the operation was to reduce the pulse from 150 to 100, and the temperature from 105·1° to 104·6°. The patient, however, never rallied, and died the day following.

Before attempting to draw any conclusions in reference to the signs and symptoms of traumatic cerebral abscess, it would be desirable to take a survey—which must necessarily be a very rapid one—of the other similar cases to which I have already alluded. The first of these I would mention is the well-known case described by Dupuytren, one remarkable in many ways, but more particularly from the great and exceptional length of time that elapsed between the receipt of the injury and the development of signs of cerebral pressure. The patient was a young man, who was struck on the top of his head with a knife which broke, and a portion of it remained in the perforating wound. This healed, and all went on well for several years, save some occasional pains about the scar. Symptoms of compression suddenly supervened, and he was brought into hospital in a state of stupefaction. Dupuytren ascertained the existence of the foreign body under the scar, and trephined, but without relief. The dura mater was then opened, a deep incision made, and the contents of a large abscess evacuated. This brilliant operation was followed by complete recovery.

In reference to the great length of time that in Dupuytren's case elapsed between the receipt of the injury and the symptoms of brain pressure from abscess, I may mention that another case, one, however, which was not operated on, has been recorded by Mr. Lawrence, in which the injury of the head preceded the death of his patient from abscess in the brain by almost five years.

M. Roux published a case in which, after trephining, he opened the dura mater, but with a negative result. He proceeded no

further, and the patient died. The autopsy revealed a large abscess below and behind the spot trephined, immediately under the cortical substance of the brain.

Mr. Cæsar Hawkins has also recorded an instance of subdural cerebral abscess, in which the symptoms did not manifest themselves until a month had passed from the date of the injury. After trephining, the dura mater was found in a sloughy state, and a large opening in it, through which escaped a quantity of matter. The patient died five days after the operation, and an abscess was found on the back part of the left hemisphere, reaching down to the left ventricle, into which it had nearly opened.

A case of cerebral abscess, resulting from a gunshot injury, is recorded in the *American Journal of Medical Science*, by Drs. C. Fenger and E. W. Lee, of Chicago. The ball did not penetrate the cranium, but fractured the margin of the orbit, and passed upwards and outwards for two cms. Here it lodged, and was cut down upon and extracted. In a *précis* of the paper by my colleague Mr. Thomson, in the *Dublin Journal of Medical Science*, 1884, it is stated that in forty hours the patient had intense headache and pain in the orbit, he vomited, had some exophthalmos, and there was loss of vision. The fracture was then exposed, some bone removed, and a small abscess in the orbit evacuated. A month after the injury he was able to leave the house, but he soon felt faint, and had to return home. A day later he became drowsy, with a pulse of 54, and finally comatose. The temperature was normal; there was no paralysis.

In this case trephining was performed, the dura mater opened, and a succession of punctures made in different directions and of varying depths before the matter was discovered. It was found at a depth of two and a half inches; about an ounce and a half of pus was withdrawn. A week subsequently the patient again became comatose, and the operation was repeated, this time the needle being inserted to a depth of fully three inches, when a small quantity (about half a tea-spoonful) of thick yellow pus was removed. In seven weeks from this time he resumed his duty as a policeman. Some months later, in July and again in December,

he had epileptic seizures, but it was not stated whether he remained liable to these subsequently.

A remarkable, and, as far as I can ascertain, the first case in which exploration and aspiration were employed in dealing with cerebral abscesses was a case published by Rentz, noted in Fenger and Lee's paper,[a] in which aspiration was performed in a case of cerebral abscess twice daily for a period of twelve weeks, with complete ultimate recovery. The abscess was the result of a punctured wound inflicted with a knife which, as in Dupuytren's case, broke, and the point was left impacted in the tissues. The wound was over the right frontal region. Eleven days subsequently to the receipt of the wound, symptoms of cerebral pressure having set in, the wound was reopened and the point of the knife extracted. This was followed by the escape of fœtid matter. In this case trephining was not had recourse to, but the abscess was evacuated by aspiration through the wound, the operation being performed twice daily, this treatment continuing for the protracted period of twelve weeks. The result in this case was in every way satisfactory. There was no definite proof that the abscess was subdural, but from the account given by Rentz he was obviously of opinion that the abscess was one involving the brain substance.

For the purposes of exploration Rentz has recommended blunt-pointed needles as being less likely to injure the blood-vessels during their passage through brain tissue. The suggestion is, I think, a sound one, and deserving of adoption.

Mr. Macewen, of Glasgow, has had considerable experience in both epi- and sub-dural cerebral abscesses, having seen ten cases. Of these six were operated on, with three recoveries, of which only one, however, had a distinctly traumatic origin. The particulars of this case have not as yet been published, but Mr. Macewen states that the cerebral abscess showed itself a fortnight subsequently to the receipt of the injury, and was attended with the usual signs indicative of brain pressure. It was not situated below the wound, and its presence and position in the brain had to be determined by the exhibited symptoms.

[a] Amer. Journal of Med. Science, July, 1884.

In the "Medico-Chirurgical Transactions" for 1879, Mr. Hulke has published a case of traumatic cerebral abscess. The patient was an errand boy aged fifteen, who, hurrying out of a factory, stumbled against an iron fence by which his forehead was grazed; he was stunned, but soon recovered. For a month he remained at his employment, and then began to be troubled with nausea, and soon after to vomit occasionally. On admission into hospital five weeks after this injury, the symptoms were considered indicative of intra-cranial inflammation. The following day incomplete hemiplegia was observed, and this, with the other symptoms present, enabled Mr. Hulke to diagnose cerebral abscess. Trephining was performed, and a fine trocar pushed through the membranes into the brain; when at a depth of about an inch some thin greenis pus rose into the syringe. A free opening was then made with a narrow knife along the trocar, and a considerable quantity of pus evacuated; the hemiplegia and retching ceased immediately after the evacuation of the abscess. Although the boy's life was unquestionably saved by this operation, still the result of it cannot be said to have been satisfactory, for ultimately the patient became blind and subject to epileptic seizures.

Sir James Paget[a] and Mr. Marshall[b] have each published a case of traumatic cerebral abscess, in which they performed the operation of trephining. The result, however, in neither case was satisfactory, owing doubtless to the fact that the former was one of multiple cerebral abscess, and the other one of extensive meningeal inflammation and diffuse suppuration.

Among the points in these cases which are of special interest and deserving of consideration, are, first the etiology of such cerebral abscesses, and also the remarkable latency of the symptoms usually connected with them. The two cases I have recorded in this communication do not—owing, doubtless, to the paralysis in both cases having been so profound—throw much light on the subject of the localisation of cerebral function; a subject which at present is so largely exercising the surgical mind. As regards

[a] Medical Times and Gazette, 1860.
[b] Lancet, 1857.

their etiology, we must, I think, accept the views held by my late colleague Dr. M'Dowel, and also Sir W. Gull—namely, that the traumatic forms of these abscesses are mainly due to a primary phlebitic condition of the veins of the diploe, which vessels, from their intraosseous position, are specially prone to absorb fluid, and that, as results of this, death of portions of the cranial wall occurs, and ultimately cerebral abscess.

The symptoms connected with this condition must necessarily vary much. In the first place they depend largely on the locality in which the abscesses form. Thus it has been pointed out by Huguenin,[a] whose remarks are quoted by Dr. J. Burney Yeo in his valuable paper on this subject,[b] that when the abscess occurs in the temporal lobes "the difficulty of diagnosis is increased by the circumstance that no bands of fibres which are direct conductors of sensibility or motion pass through this lobe." An abscess, therefore, may attain a considerable size, and may cause general symptoms of compression before any distinct symptoms of disease arouses the suspicion of a localised affection of the brain; and for this reason the acute abscesses belonging to this category in the great majority of cases have not been positively diagnosed.

The latency of the symptoms may be due, therefore, to the occurrence of the abscess in particular situations, or to the brain being able to endure up to a certain point an amount of pressure, when slowly and gradually applied, which, when suddenly received, as in the case of hæmorrhage or bone depression, it cannot tolerate. It seems to be analogous to what occurs in the spinal cord in cases of vertebral caries, and spinal fracture or diastasis. In the former the cord becomes, if I might so express it, acclimatised to the pressure it sustains consequent on the great, and at times grotesque alterations in the shape of the column, resulting from caries of the bodies of the vertebræ. In the case of fracture or displacement, however, even when the pressure on the cord is slight, but suddenly produced, the symptoms of paralysis are promptly and distinctly manifested.

[a] Ziemssen's Cyclop., Vol. XII.
[b] British Med. Journal, 1879.

From the foregoing observations and cases which I have adduced, the following propositions may, I think, be stated :—

1. That after the primary symptoms of cerebral traumatism have subsided there is frequently a latent period of varying length, during which there are no distinct brain symptoms connected with abscess formations whatever.

2. That their appearance is, as a rule, sudden, and if uninterfered with, they run a rapidly fatal course.

3. That the occurrence of pus production resulting from cerebral traumatisms is not incompatible with a perfectly apyrexial condition.

4. That this latter fact will probably aid in differentiating traumatic cerebral abscess from meningeal or encephalic inflammation.

5. That both as regards colour and consistence there is great variety in the contents of cerebral abscess cavities, and that, as as shown in Wilm's case, published by Rose of Berlin, they may become transparent.

6. That antisepticism has largely diminished the risks of the operation of trephining.

7. That having regard to the great mortality of cases of cerebral abscess when uninterfered with—viz.. from 90 to 100 per cent.—that the operation is indicated even when the patient is *in extremis*.

8. That in the case when the trephine opening does not correspond to the situation of the abscess, exploratory puncture and aspiration may be employed.

9. That by the adoption of this measure the necessity for multiple trephine openings can be largely obviated.

10. That the employment of a blunt-pointed aspirating needle, as suggested by Rentz, is probably the safest mode of exploration and evacuation.

11. That drainage is desirable in the after treatment of such cases.

12. That both during and subsequent to operative interference in these cases a rigid antisepticism is imperatively required.

CASE OF TRAUMATIC APHASIA SUCCESSFULLY TREATED BY THE REMOVAL OF A BLOOD-CLOT FROM THE INTERIOR OF THE CEREBRUM.

By CHARLES B. BALL, M.D., M.Ch.;
Fellow and Examiner in Surgery, Royal College of Surgeons in Ireland; University Examiner in Surgery; Surgeon, Sir Patrick Dun's Hospital.

[Read before the Section of Surgery, February 24, 1888.]

F. B., aged twenty-six years, was admitted into Sir Patrick Dun's Hospital, September 1st, 1888. He stated that during a drunken squabble, ten days previously, his father had struck him on the head with a penknife. I was unable to get any reliable account of his condition immediately subsequent to the injury, but the following day he presented himself at another hospital and had his wound dressed. He said that at that time he had difficulty in speaking correctly, and that this difficulty has increased somewhat during the last few days, and that pain in the left side of his head, which had been present all the time, had lately increased considerably.

Upon examination a small scar was found adherent to the scalp over the squamous portion of the left temporal bone. The exact position of this wound was as follows:—Two and a half inches from the back of the mastoid process; two inches from the external angle of the orbit, and three-quarter inch above the zygoma on the left side. The scab, when detached, showed a cicatrix apparently extending deeply through the temporal muscle, but the wound was quite healed.

Classifying the symptoms presented by this man during his stay in hospital, we found that his aphasia was of a somewhat complex character, and that both forms of motor and sensory aphasia were to a certain extent present.

Motor Aphasia (speaking).—He used wrong words in sentences which he originated himself—*e.g.*, he said he had a "man" in his ear when he meant "pain;" and although he sometimes spoke so as to be intelligible, yet at others he introduced such a number of wrong words that it was impossible to understand what he desired to communicate. He was unable to name correctly common objects, such as a watch, a ring, a chain, a bottle, &c. Although he called a watch a "pin" or a "stone," or some name of that kind, he was usually able to tell the time. When shown a coin of any kind he invariably at once said "money," and appeared highly satisfied with his sagacity, but was unable to name the coins shown him, with the exception of sixpence, which he always called a "tanner." (Writing)—He was able to write his name with ease and in a good hand, and was able to copy writing, but was absolutely unable to write words which he originated himself or from dictation; his attempts to do so did not show a single properly-formed character.

Sensory Aphasia (word blindness).—When given a book to read he said the words ran into one another and he was unable to make them out. When he attempted to name printed words he was nearly always wrong. (Word deafness)—When asked questions his answers were sometimes so irrelevant as to suggest that he had not appreciated the meaning of the query correctly. When asked if he would like some dinner, he said, "I am a bit better." When told to put out his tongue he opened his mouth only, but when he was set an example he at once protruded his tongue; this was frequently tried with the same result.

There was no paralysis whatsoever to be detected of any of the voluntary muscles when he came under my observation, and, judging from the fact that the day after the injury his case was not considered sufficiently grave for admission into another hospital, there could not at that time have been any overt paralysis. Hearing and sight were good on both sides, and ophthalmoscopic examination revealed nothing. Sensation was everywhere normal.

Five days after his admission his symptoms had so much increased that it was determined to operate. A flap was turned down, including portion of the temporal muscle, and containing in its centre

the cicatrix; this disclosed a wound of the squamous portion of the temporal bone of a size and shape likely to be produced by the small blade of an ordinary penknife, held horizontally, with the back of the knife towards the patient's back, and the edge looking directly forwards. A medium-sized trephine was now applied, and a circle cut out, containing in its centre the cut in the bone; this was attended with some difficulty, as the lower part of the circumference was exceedingly thin, while the upper portion was tolerably thick; the piece was, however, removed without injury to the dura mater by the trephine. It was found that the knife had perforated the dura mater and brain. The wound in the dura mater was enlarged, in doing which the large posterior branch of the middle meningeal artery was divided, and gave some little difficulty to control; this vessel had very narrowly escaped injury by the penetrating knife. A sinus forceps was gently passed along the brain wound, and the blades separated, when a dark-coloured blood-clot presented, and was gradually extruded by the internal brain pressure. Some more fragments of clot were removed by the sinus forceps, and by a stream of weak perchloride of mercury solution from a syringe. A drainage-tube having been introduced, the flap was replaced and held in position by deep sutures, including the temporal muscle.

On the evening of the same day the patient was much more rational, and carried on a long conversation, with very few mistakes in his selection of words. Next morning he was again more aphasic, and it was found that the drain had become blocked. Upon freeing it a considerable quantity of fluid, containing broken-down blood-clot, was removed, and his power of speech improved. He made an uninterrupted recovery, and regained completely his power of writing, reading, and speaking.

In this case I believe the knife penetrated the superior tempero-sphenoidal convolution, traversed the fissure of Sylvius, and probably injured Broca's convolution, and that his symptoms were due to a blood-clot in the fissure of Sylvius, which was breaking down, and which was evacuated by timely surgical operation.

ON SUPRA-PUBIC LITHOTOMY AND VESICAL SUTURE.

By KENDAL FRANKS, M.D., Univ. Dubl.;
Fellow and Member of Council of the Royal College of Surgeons in Ireland;
Surgeon to the Adelaide Hospital, Dublin.

[Read before the Section of Surgery, April 13, 1888.]

Although I have adopted the method of supra-pubic lithotomy for the removal of vesical calculi only in a single case, I think it is scarcely necessary to offer any apology for bringing the subject before the Royal Academy of Medicine in Ireland, because, in the first place, the revival of this operation dates only from 1880, when Petersen, of Kiel, demonstrated the effects of distension of the rectum and bladder upon the anterior vesical fold of the peritoneum; and, secondly, because this operation has not yet been discussed by this Academy, although it has excited much interest and discussion both in England and in other countries. The operation itself is not a new one. Whether it was ever attempted by the ancients is a question for speculators who revel in the mists of antiquity, but the first authenticated case was recorded by Pierre Franco, of Lausanne, in 1556. He thus describes the case in his work "Petit Traité sur les Hernies":—"It occurred once that I wished to remove a stone from a child of ten years or so, but in spite of all my efforts I could not bring it down to the neck of the bladder. In view of that fact, that the patient was very much exhausted by his sufferings, and that the parents desired rather that he should die than live in such agony, also that I did not wish it to be a reproach to me that it should not be extracted, although it was foolish, I decided to cut the bladder from the pubis, a little to the left. This I did, cutting upon the stone, which I had raised up with my fingers inserted in the fundament, and held under control by the hand of an assistant, who compressed the

abdomen into the pelvis, and in this way I extracted it. The stone was as large as an egg. Nevertheless, the wound consolidated and was healed. However, I would not advise anybody to do this, but rather to use the procedure devised by us, of which we have spoken."[a]

Franco's advice seems to have been followed generally, and we do not hear much of the operation until 1680, when Hildanus described it, urging the necessity of bringing the stone into position near the opening, by putting the fingers into the rectum for that purpose. "It is interesting to observe," says Sir Henry Thompson, "that at this early date there was a recognition of the advantage to be obtained by making pressure on the stone in a direction from below upwards through the rectum."[b]

The next published case of supra-pubic cystotomy was by Proby, a Dublin surgeon, who removed a bodkin from the bladder of a young woman, aged twenty, in 1694.

The subsequent history of the high operation is one of warm discussions between its few supporters and its host of opponents. Its struggle for existence threatened to terminate fatally. In the earlier part of this century it had scarcely got beyond the position described by Bégin in 1826, that it should be resorted to only in those cases where "deformity of the pelvis and the size of the stone rendered the perinæal operation impossible."

During the present century, however, the high operation has enjoyed a much larger share of support than formerly, and that even before the modifications or improvements introduced by Petersen, of Kiel, in 1880, placed the supra-pubic method upon its present popular basis. Thus we find that Dr. C. W. Dulles, of America, collected 636 cases of the high operation performed by the older methods up to July, 1881, 70 of these being done by American surgeons.[c] The total death-rate has been 28·6 per cent., or 1 in 3·5. The operation has usually been reserved for large stones, and when we compare the results obtained by the sectio-

[a] Annals of Surgery. Vol. II., p. 176.
[b] On Supra-pubic Lithotomy. Thompson. 1886. P. 6.
[c] Gross. System of Surgery. 1882. Vol. II., p. 759.

alta in these cases with the results of lateral lithotomy, based on the table of perinæal operations published by Keith in 1869,[a] we find that even under the unfavourable conditions of the older methods the supra-pubic operation gives decidedly the best results for large stones. In the case of small calculi—that is, calculi weighing less than an ounce—the death-rate by the old supra-pubic method is 9·3 per cent., and by the lateral method 8·9 per cent., results so nearly equal that it is not to be wondered at that when improved methods of operating, based on Petersen's researches, were thrown into the scale on the side of the high operation they should have given it such a stimulus as to threaten to extinguish the lateral method.

Prof. Petersen, of Kiel, in his paper, read before the Congress of German Surgeons in April, 1880, advocated a return to the supra-pubic method.[b] In detailing the dangers which had hitherto beset this operative procedure, he enumerated three chief causes, and shows how each of these may be met. These dangers are—septic infection, urinary infiltration, and injury to the peritoneum. Septic infection is prevented by the adoption of antiseptic precautions to an extent which the lateral method does not admit of. Urinary infiltration he proposed to combat by means of suture of the bladder wound; and in order to prevent injury to the peritoneum he urged the adoption of distension of the rectum, together with distension of the bladder, by means of which the pre-vesical fold of the peritoneum is drawn or pushed upwards, leaving sufficient room above the pubis for operation, without fear of peritoneal injury. None of these recommendations is new, nor can Prof. Petersen claim priority for any one of these suggestions. Antiseptic surgery is the copyright of Sir Joseph Lister. Suture of the bladder in supra-pubic lithotomy was recommended as far back as 1581 by a French surgeon, Rousset, and was attempted by several surgeons previously to 1880; whilst the effect of rectal and vesical distension upon the pre-vesical fold of peritoneum was demonstrated by Dr. J. G. Garson, of Edinburgh, in a paper read

[a] British Medical Journal. March 20, 1860.

[b] Ueber Sectio-Alta. Archiv für Chirurgie. Langenbeck. 1880.

before the German Congress in 1878, and from him, no doubt, Prof. Petersen adopted the idea and put it to practical use. To Petersen undoubtedly is due the credit of combining and of applying methods which have placed this operation upon the firm foundation which it occupies to-day.

Before discussing the various points which are raised by a consideration of this subject, I will shortly detail a case in which the modernised operation of supra-pubic lithotomy was adopted:—

Case.—H. M., a land steward, aged sixty-five, was sent up to me by Dr. David Jacob, of Maryborough, and was admitted into the Adelaide Hospital on May 3rd, 1887. He was suffering from vesical calculus. Dr. Jacob wrote to me to say that he had no difficulty in finding the stone, but considered that the case was not a suitable one for lithotrity. The sound, which he passed readily, caught the stone, "and apparently fairly indicated its size at 1 inch or $\frac{7}{8}$ inch" in diameter.

He was a tall, large, heavy man, who had enjoyed excellent health all his life until two years previously, when he noticed the urine to be of a dark coffee colour. Frequent micturition soon followed. A year later he had great uneasiness when sitting up, and a burning pain in the urethra, shooting down to the end of the penis after passing water. At this time he frequently had to pass water every hour, and sometimes he could not prevent its escaping into his clothes. For the last three months, under Dr. Jacob's care, he had much improved. He had passed no blood since the 17th of March, 1887. Since then the pain after micturition had disappeared, and he was able to retain his urine for two or three hours. It had become quite clear.

The day after his admission to hospital the urine was examined. Its specific gravity was 1022; it was acid, and after standing a short time a dense, gelatinous, whitish precipitate appeared; it contained a small quantity of albumen, and the microscope revealed pus cells, together with many triple phosphate crystals.

On May 7th the patient was put under chloroform. An ordinary Thompson's sound was found too short to reach the bladder, and a very long one had to be used. The finger passed into the rectum discovered a very large smooth prostate, beyond which the finger could not reach. The sound struck a stone, as it was being withdrawn with the curve turned upwards and the handle well depressed.

The stone was evidently lodged behind the pubes, and was of a fairly large size. On account of the great depth of the perinæum, and believing that the supra-pubic operation would in such a case be a safer and better procedure than a lateral lithotomy, I put it in practice on May 10th, 1887.

As the patient was found to have a mitral systolic murmur, one-sixth of a grain of morphin was first given hypodermically, and then anæsthesia was produced with chloroform, the effect being kept up with ether. The pubes was shaved, then scrubbed well with soap and water, and finally washed with corrosive sublimate solution (1 in 1,000). Thompson's rectal bag was then oiled, introduced into the rectum, and distended with 12 ozs. of water. A soft rubber catheter was passed into the bladder, and through it 8 ozs. of a 5 per cent. solution of boric acid was injected. The return of the fluid was prevented by tying another soft rubber catheter round the penis, without withdrawing the catheter which had been passed into the bladder. An oval tense tumour could be at once detected in the abdomen above the pubes. On account of the great quantity of adipose tissue covering the abdomen, the initial incision was made four inches long in the middle line. The fat was two inches thick. The linea alba and the fascia transversalis were divided *seriatim* to the whole extent of the original incision in the abdomen. The fold of the peritoneum was discovered at the upper part of the incision, but was nearly three inches above the pubes. There was a large quantity of previsceral fat, which was scraped through with a blunt knife, and the bladder exposed, which was not, however, fully distended. The bladder was hooked up on a tenaculum passed through its walls parallel to the line of incision, and an opening was made into the bladder large enough to admit a finger. Fluid at once poured out. A finger passed through the wound first came upon the rubber catheter and beneath it three hard calculi. The wound in the bladder was then enlarged to two inches, and, by means of a lithotomy scoop and a finger, the calculi were extracted one by one. The bladder itself seemed to be quite healthy. I therefore determined to attempt to get union by first intention by careful suture. Accordingly I introduced six or seven Lembert's sutures of catgut, passed through the external and muscular coats alone, the mucous coat being carefully inverted. I then put in a continuous suture, top-sewing the fibrous coat together, so as to completely cover in and hide the first row of sutures. Eight ounces of the boric acid solution were now injected into the bladder to

distend it, but the suture was complete and there was no leak. A drainage tube was now placed in the wound, extending from the upper angle, so as to be as far as possible removed from a source of infection, and reaching down behind the pubes and beneath the fascia transversalis. This fascia, the linea alba, and the skin, were then sutured in successive layers. Iodoform was dusted over the wound, which was dressed with sal-alembroth gauze, covered with a wood-wool pad, and firmly bandaged. The rectal bag was removed, but the catheter was retained in the bladder, and the urine was conducted through an India-rubber tube to a vessel beneath the bed.

The subsequent history of the case may be epitomised. The temperature on the day following operation reached 101·2°, but on the fourth day it became absolutely normal and remained so throughout. On the fifth day the catheter was removed, and directions were given that the urine should be drawn off every four hours. On the twelfth day the catheter was discontinued, as the patient was able to void urine naturally. As to the abdominal wound it healed in its entire length by first intention, except along the track of the drainage tube. This was not removed until the 19th of May—*i.e.*, the tenth day. I kept it in thus long on the chance of any urine leaking through the bladder wound, but this never occurred. The sinus left by the drainage tube closed rapidly as soon as the latter was withdrawn.

The patient was allowed up about the wards on the fourteenth day, but although perfectly well he was kept under observation until the 5th of June—that is, five weeks from the time he was admitted. He is still in perfect health.

The stones removed weigh respectively 237 grs., 214 grs., and 215 grs.; in all, 666 grs.—that is, $10\frac{3}{4}$ grs. more than $1\frac{1}{2}$ ozs. They measure respectively $1 \times 1\frac{7}{16}$ inches, $1\frac{3}{8} \times 1\frac{1}{4}$ inches, and $1\frac{3}{8} \times 1\frac{3}{16}$ inches.

It is interesting to observe the great similarity these calculi present in appearance, size, and weight.

In this case we have illustrated the three factors of success urged by Petersen—namely, antiseptic precautions, vesical suture, and double distension, both rectal and vesical. Of the first of these I need say nothing, as operating surgeons all over the world are practically agreed at present on their efficacy. Of suture of the bladder we are far from unanimity. Sir Henry Thompson does

not employ it; in France it is rarely resorted to; in Germany we find some of its most ardent supporters and its bitterest opponents. It cannot be denied that suture of the bladder, when successful, attains the ideal in supra-pubic cystotomy. But the whole essence of the question lies in the reservation "when successful." Unfortunately, vesical suture has a long array of failures to contend with—failures, I mean, in the sense that the sutures have not succeeded in preventing the urine from flowing through the abdominal wound. But, on the other hand, suture of the bladder has been sufficiently often successful to encourage surgeons in attempting it. Of course, it is understood that I am dealing only with suture of that part of the bladder which is not covered with peritoneum.

Now let me shortly examine the objections which have been made to the immediate closure of the bladder by suture in supra-pubic cystotomy. Firstly, it has been stated by some, and most positively by so eminent a surgeon as Trendelenburg,[a] that it is almost impossible to cite a single case in which the urine, either entirely or in part, has not in a short time made its way through the abdominal wound—in other words, that it is useless to attempt suture, because it always fails. Now, what are the facts? In a table published by Dr. Schmitz, of St. Petersburg, in 1886,[b] in which he had collected together all the cases of vesical suture known to him up to date, we find it had been attempted in 55 cases in which the result was known. Of these, 17 cases healed by first intention. The first case on record was that of Lotzbeck in 1858,[c] and which proved a complete success. The same operator scored the second success in 1859. The next two successful cases were by English surgeons, Sir Joseph Lister and Mr. Gamgee, both in 1873. Since the publication of Schmitz's statistics, I have found several cases which have been added. One by Pilcher,[d] of New York, in 1885, the patient, a man twenty-one years of age, return-

[a] Berliner klin. Wochenschrift. 1881. P. 1.
[b] Langenbeck's Archiv. 1886. P. 457.
[c] Bruns. deutsche Klinik. No. 15.
[d] Lancet, Jan. 23, 1886.

ing home perfectly well on the 11th day. One by Mr. Parker,[a] of the Children's Hospital, London, of a child aged three, who left hospital cured on the 16th day. Two cases by Zangarol, of Alexandria—one successful, the patient leaving hospital on the 7th day.[b] One by Sir Wm. MacCormac,[c] in a boy aged three and a half, in which recovery was complete in a week. And my own case, in which the patient was up and about on the 14th day.

In the face of Schmitz's table, which shows that complete success has been attained in 31 per cent., not counting the cases which have since been added, I think I am fully justified in saying that the success attained not only justifies but strongly encourages us in making the attempt. The next objection raised to vesical suture is of a more serious character—namely, that when the suture does not hold it leaves the patient in a worse condition than if the bladder-wound had been left open, and that the death-rate after suture is higher than the death-rate of supra-pubic cystotomy generally. Now, here again we must appeal to statistics. I have already referred to Dr. Dulles' table, in which he has collected 636 cases of the high operation, and the death-rate he has found to be 28·6 per cent. What is the death-rate when the bladder has been sutured? The most complete table, so far, is that of Schmitz, of St. Petersburg. Of the 55 cases of vesical suture 8 died—that is, a percentage of 14·5, or very nearly one-half of the death-rate in supra-pubic cystotomy. Hence we see that this objection falls completely to the ground, and that suture of the bladder offers a better chance to the patient than when the wound is left open.

The third objection made to vesical suture is that it lengthens the operation and is difficult to perform, on account of the smallness of the field of operation, and the depth to which the bladder sinks when once it has been opened. This objection may have had force before distension of the rectum was introduced. But the pressure of the rectal bag throws the bladder forwards within easy reach of the operator's hands, and, moreover, affords a most valuable support

[a] Lancet, July, 1886.
[b] Revue de Chirurgie. 1885. P. 258.
[c] Brit. Med. Jour., Oct. 2, 1886. P. 621.

behind it. It is obvious that the rectal bag should not be emptied until the suture is completed. In my own case I did not find the least difficulty in introducing a double row of sutures, and the time occupied in so doing did not prove to be of a deterrent length.

Lastly, Koenig[a] finds fault with suture of the bladder because it fails exactly in those cases in which its success would be most desirable—that is to say, in cases in which the urine is alkaline, fœtid, and swarming with septic organisms. Undoubtedly this is the case, and it is still an open question whether, under such circumstances, it would not be wiser to leave the wound open and to employ antiseptics freely. At the same time, it is not sometimes impossible, by appropriate treatment, to rectify this condition of the urine before the sectio-alta is resorted to.

We see then that suture of the urinary bladder in supra-pubic cystotomy has been successful in a certain proportion of cases, about 31 per cent., and we have reason to hope that as many of these were performed in the pre-antiseptic era, the next series of cases, under more strict antisepticism and more perfect methods of operating, will show a much larger percentage of successes. Still we are faced by the fact that up to the present about two cases out of every three have failed. What is the reason of this failure? Probably the chief cause is that we have to deal with the fibrous coat of the bladder and not with its peritoneal; and, just as it is easy to obtain immediate union between peritoneal surfaces opposed to one another, so is it difficult to obtain primary union when these surfaces form part of a fibrous envelope.

On account of this difficulty, Duchastelef[b] has proposed to open deliberately the abdomen through the peritoneum, and to operate for large stones through the antero-superior surface of the bladder; and M. Villeneuve, Surgeon-in-Chief of the Hospitals at Marseilles, says, in speaking of this suggestion[c]:—"For my part, I am greatly disposed to follow him in this path, and I would even extend the field of this proposition by asking whether, with regard to the

[a] Centralblatt für Chirurgie, 1886.
[b] Revue de Chirurgie. 1883. P. 104.
[c] Ibid. P. 685.

future and present progress of surgery, the bladder will not some day be always opened on its serous aspect, so as to replace friability by plasticity, and whether it is not in this direction that the definite solution of the problem will be found?"

But there are other causes, besides this anatomical one, which operate to prevent suture of the bladder being successful. It generally fails in cases where, by long distension, the bladder wall has become thinned or diseased. A putrid condition of the urine also militates against it. In these cases it is questionable whether the attempt should be made. But, even in cases where the urine is healthy and the bladder wall is unaltered, success may not be effected on account of the injured conditions of the edges of the bladder-wound, caused by the manipulations required to extract the stone. Hence it is of the utmost importance that the surgeon should pay particular attention to avoid any unnecessary bruising or tearing of the edges of the wound, if he wishes to attain the ideal of supra-pubic lithotomy—immediate union of the bladder-wound.

The advantages of *successful* suture of the bladder are almost too obvious to require even to be mentioned. It unquestionably hastens recovery. Ten days, on an average, have been estimated as the gain in time, but sometimes the gain is considerably more. Moreover, it effectually prevents the possibility of urinary infiltration. But, even when it fails to permanently close the bladder, the sutures, if applied properly, will hold at least for three days, as pointed out by Ultzmann, and by that time the raw surfaces in the abdominal wound will be more or less protected by adhesive inflammation, so that the dangers of urinary infiltration will be considerably diminished. Hence I would suggest that the drainage tube placed in the parietal wound outside the bladder should not be removed, as is usually the case in septic operations, at the end of the first 24 or 48 hours, but that it should be retained at least for a week, until all fear of the bladder-wound opening up should have passed away.

One of the great dangers of all operations on the bladder is urinary infiltration. It is not the special property of supra-pubic lithotomy, nor is the occurrence of it a frequent result of this high operation. In a paper published, by Dr. Dulles, in the *American*

Journal of Medical Science in 1878, he states that he has been able to find only seven cases of urinary infiltration in 478 cases collected. Souberbielle met with it only once in thirty-nine operations. Hence we cannot look upon it as a frequent danger in any sense in the supra-pubic method. Still all necessary precautions should be taken to prevent it. In cases where the bladder is not sutured, but where it is left open or partially closed and drained through the abdominal wound, it will be better to adopt the plan recommended by Sir Henry Thompson, of dressing the wound lightly, rather than to plug it and to bind it up. The former gives free egress to the urine, the latter will force the urine into the cellular tissue outside the bladder. The plan adopted by Trendelenburg, and some others, of keeping the patient constantly lying on the abdomen, seems an unnecessarily harsh proceeding, and one not very likely to be followed generally.

I have not thought it necessary to enter at length into the question of the relative value of vesical distension alone, or of supplementing it by distension of the rectum. Mr. Barwell, at the meeting of the Medico-Chirurgical Society of London, in March, 1886,[a] attempted, by some experiments, to show that the elevation of the anterior vesical fold of peritoneum was entirely due to the bladder distension, and that the rectal bag had no appreciable effect upon it. But, in presence of Dr. Garson's paper, published in 1878, in which he detailed the experiments he made to prove the influence of the combined distension, and of Fehleisen's paper in the *Archiv für Chirurgie* for 1885, and, more recently still, of Sir William MacCormac's article in the *British Medical Journal*,[b] which entirely corroborate Dr. Garson's statements, I think Mr. Barwell will find it difficult to draw converts over to his side.

His views shortly put are these—that the elevation of the pre-vesical fold of peritoneum is entirely due to the bladder distension, for, if the rectum be *alone* distended, the position of this fold is unaffected. So far his contention would seem unassailable, but, when he goes on to assert that with a bladder distended with fluid

[a] Transactions. 1886. P. 341.
[b] March, 1887.

Fig. 1.

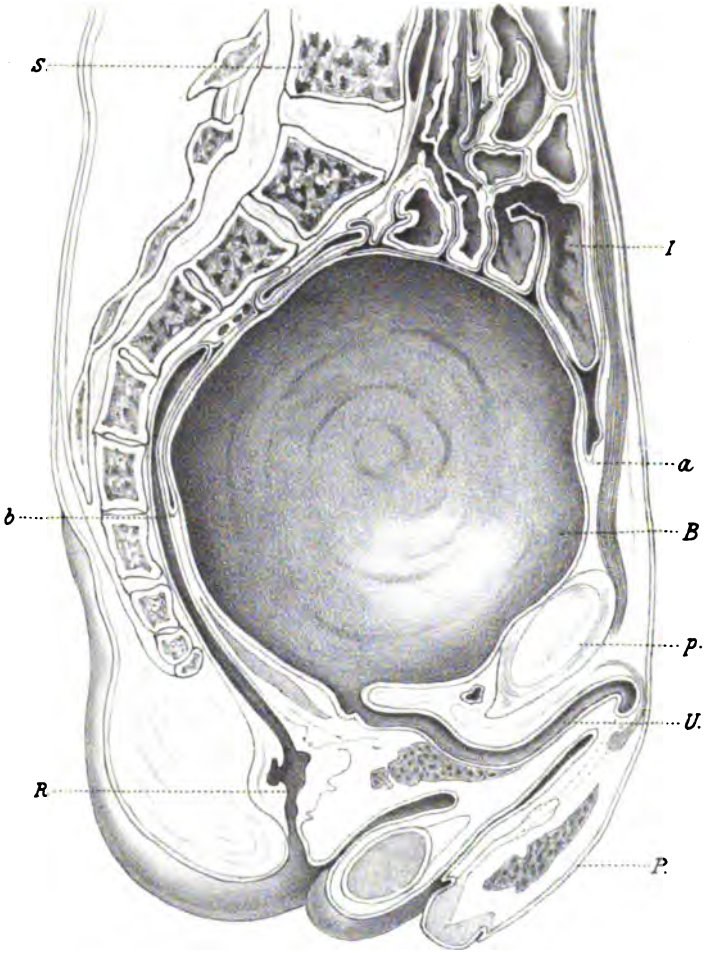

Fig. 1 represents the effect of distension of the bladder alone upon the prevesical reflection of the peritoneum (after Fehleisen).

B—Bladder distended with 630 cc. of water.
R—Rectum, undistended.
S—Spinal vertebræ.
I—Intestines.
p—Pubes.
P—Penis.
U—Urethra.
a—Prevesical reflection, 2 cm. (about ¾ inch) distant from pubes.
b—Recto-vesical reflection of peritoneum

F. Huth, Lith^r Edin^r

Fig. 2.

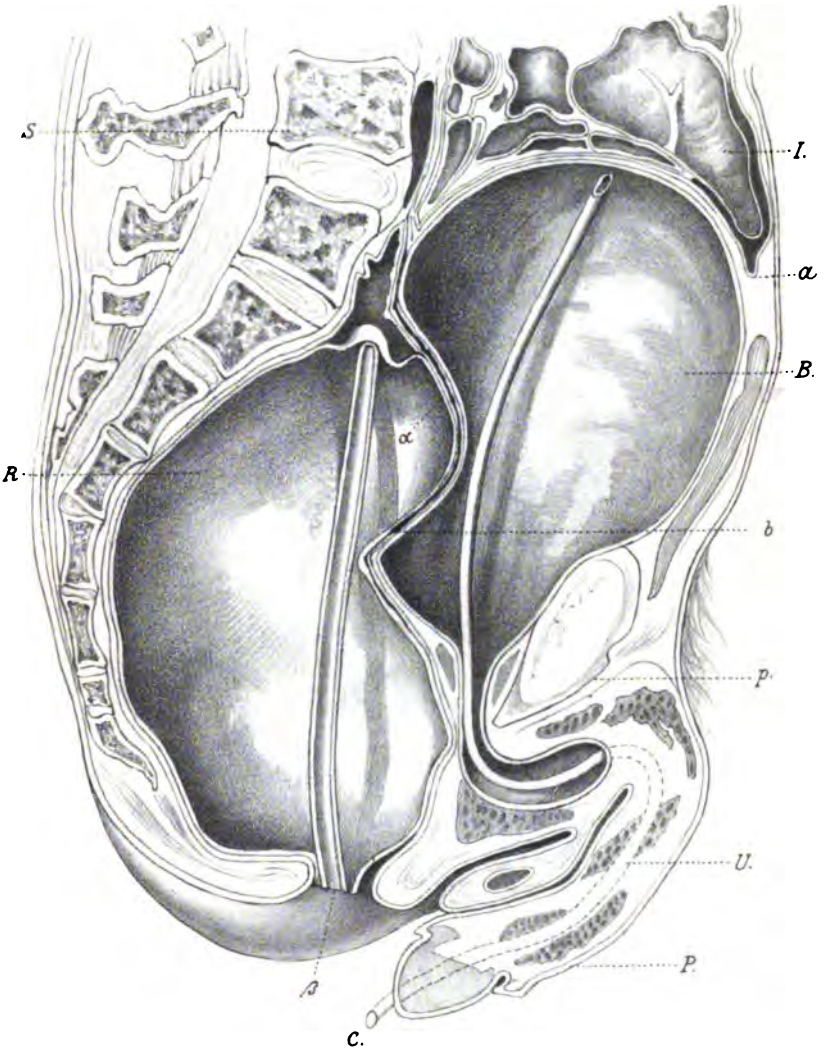

Fig. 2 represents the effect of distension of both bladder and rectum upon the prevesical fold of peritoneum.

B—Bladder distended with 420 cc. of water.
R—Rectum distended, by means of Petersen's bag, with 500 cc. of water.
S—Spine.
I—Intestines.
p—Pubes.
P—Penis.
U—Urethra.
C—Catheter in bladder.
a—Prevesical fold, raised 8½ cm., about 3¼ inches.
b—Recto-vesical fold.

F. Huth, Lith^r Edin^r

the position of this fold of peritoneum is scarcely at all affected by subsequent rectal distension, his experiments are directly opposed to those of the authorities I have quoted. An examination of the plates (Fig. 1 & 2) taken from drawings made by Fehleisen from frozen sections, the result of vesical distension alone and of the double distension are at once apparent. The effect of filling the rectum with fluid is to flatten the bladder antero-posteriorly, and thus by shortening its antero-posterior diameter to increase its diameter from above downwards.

In Fig. 1 the bladder has been distended with 630 cubic centimetres (about 22½ ounces) of fluid whilst the rectum is empty. The prevesical fold has risen so as to leave a clear space of two centimetres (about ⅘ inch) between it and the pubes. In Fig. 2 the bladder has been distended with 420 cubic centimetres (about 14½ ounces) of fluid, and the rectal bag contains 500 cubic centimetres (about 17½ ounces) of water. In this case the anterior fold of peritoneum is 8½ centimetres (3⅓ inches) distant from the pubes—that is to say, there has been a gain of about 2½ inches in the space for operative purposes.

But, independently altogether of the effect upon the fold of peritoneum in front of the bladder of introducing an elastic bag into the rectum and then distending it with water, this procedure affords some great and incontrovertible advantages. It forces the bladder forwards. It approximates the posterior to the anterior wall of the bladder, and thus brings the whole of the bladder not only within reach of but within sight of the surgeon, and, finally, it affords a firm support behind to the bladder; and these are advantages which the operator will appreciate in removing vesical tumours or extracting calculi or foreign bodies.

The operation of supra-pubic cystotomy in its modern development is still too recent for surgeons to agree as to the limits of its applicability. There are certain classes of cases upon which all operators are practically agreed that this method is the safest and best. Dr. Dennis, of New York,[a] thus formulates the cases in

[a] American Surgical Association, 1887; and Annals of Surgery. Vol. VI. 1887. P. 261.

which exploration of the bladder by the supra-pubic method is indicated—1. In cases of lithotomy for large hard calculi; also when lithotomy is required in a patient suffering from paraplegia, a contracted pelvis, perinæal tumours, encysted calculi, ankylosis of the hip, hæmorrhoids or great obesity. 2. For the removal of certain foreign bodies, as hairpins, bodkin needles, &c., for the treatment of chronic cystitis, and for the removal of calculi in the female. 3. In lithotomy occurring in a patient with greatly enlarged prostate, or with fibroma of the prostate, or in calculi lying in diverticula behind the prostate. 4. For excision of tumours of the bladder. 5. For rupture of the bladder.

The above list illustrates well the class of cases in which surgeons are practically agreed that the supra-pubic operation is called for. I believe, however, that as it becomes better known it will gradually be extended to a much larger field. In an earlier part of this paper I stated that the modifications which had been recently introduced into the *modus operandi* had given it a stimulus which threatened to extinguish the lateral method. This may not be the case with surgeons of large experience in operating for stone, but with the vast majority of operators I believe this will be the result. This method is only now fighting its way, but so far it has fought its way well. The grounds on which I base this opinion are—First, that the operation is an easy one, much easier for the general run of operating surgeons to perform than the lateral operation, or even than litholapaxy. 2ndly. The freedom from hæmorrhage, there being no named vessels in the line of incision to deter the operator; whilst in the lateral method the danger from hæmorrhage must always be present to the surgeon's mind. 3rdly. There is no risk of wounding the genital apparatus in boys—a risk which has often been urged in the lateral operation. 4thly. The high operation is specially indicated in females. on account of the frequency with which a vesico-vaginal fistula follows the usual methods of removing calculi or foreign bodies from the bladders of women and girls; and the supra-pubic method also prevents the occurrence of incontinence of urine, especially in aged women. 5thly. This operation admits of a more perfect

adaptation of the principles of asepticism than any other, and consequently of a great reduction in the septic danger which may result from operations for stone. 6thly. It diminishes the chances of a re-formation of stone, consequent upon the retention of particles within the bladder, as sometimes follows on lithotrity. Lastly, the operation promises to be eminently a safe one. In the earlier part of this paper I referred to Dr. Dulles' table of statistics of 636 collected cases, dating back to the earliest times, in which the bladder had been opened above the pubes. This table gives a mortality of 28·6 per cent. But this table refers to the old method of operating. Dr. Dennis, of New York, has collected 127 cases performed since 1879, with a mortality of 9 per cent.; and these deaths were chiefly due to septic infection—an avoidable cause in these days. But the latest record is by Dr. Edmund Assendelft, of Wetoschkino, in Russia,[a] who publishes 102 cases in which he has performed supra-pubic lithotomy, with two deaths. But one of these deaths was in a boy, aged four, who died of general marasmus, follicular ulceration of the intestines, and bronchitis—conditions in no way due to the operation; so that the mortality is about 1 per cent.

When other operators are able to show that this is a more accurate estimate of the modern sectio-alta—and I believe they will—we shall find the high operation more generally adopted for even small stones than it is at present, and the lateral operation in an equal degree abandoned. Sir Henry Thompson, in his monograph, thus concludes:[b]—"So safe and so simple, indeed, is the supra-pubic operation here described, that I will reiterate in this place before concluding, and with increased emphasis, an opinion incidentally mentioned at the outset. I believe that a surgeon who is not practically familiar with lithotrity, on meeting with a hard calculus, which is found on trial not to be readily seized with a lithotrite, will be more likely to achieve a lasting success for his patient by adopting the cutting in preference to the crushing operation."

[a] Archiv für klinische Chirurgie. 1888. P. 525.

[b] The Supra-pubic Operation of Opening the Bladder. Sir Henry Thompson. 1886. P. 43.

SUPRA-PUBIC LITHOTOMY.

By F. ALCOCK NIXON, F.R.C.S.;
Surgeon to Mercer's Hospital; Lecturer on Surgery, Ledwich School.

[Read before the Section of Surgery, April 13, 1888.]

ALTHOUGH the high operation for stone was performed more than three centuries ago, it has only very recently been introduced into practice in this country. Its value can be judged only by statistics, and if these are to be reliable, all cases, whether successful or unsuccessful, should be published.

The case which I have the honour to bring before the Academy, though unsuccessful, possesses, I think, some points of interest. Moreover, it was, I believe, the first upon which supra-pubic lithotomy was performed in Ireland.

CASE.—The patient, an old gentleman, eighty-one years of age, fifty-seven years ago suffered from "bleeding from the bladder and a stoppage of water, for which he consulted the late Surgeon Abraham Colles, of Stephen's-green, who sounded him for stone, but 'found nothing wrong.'"

The hæmorrhage recurred at intervals every five or six years for fifty years. During the last six years he had it constantly, accompanied by pain on exercise, and jolting on a car always made it worse. "Shooting" pains commenced within the latter period, though often he had not the slightest inconvenience whatever.

When I first saw him, in March, 1887, he was passing daily a very considerable quantity of blood and pus, mixed with ammoniacal urine. He was much weakened by this loss of blood and constant pain. His pulse was weak and intermittent, and on one occasion, when in the city transacting some business, he suffered from an alarming attack of cardiac syncope, so that it was necessary to bring him home in a cab. He suffered from similar attacks before and subsequently, but none was so severe as the final one, which proved fatal.

I saw him daily for more than a month, during which time I frequently urged him to allow me to sound him, but fear of the pain prevented him. Seeing that he was becoming much weakened by the constant pain, sleeplessness, and loss of blood, I advised consultation, and at his request I called in Sir George Porter, but again he obstinately refused to allow an instrument to be introduced.

When at last the pain and sleeplessness were manifestly destroying life he consented, and the sound readily detected the presence of a large calculus. The urethra was extremely small and irritable, and after the introduction of the instrument there was considerable constitutional disturbance, rigors, and high temperature, &c., which symptoms, however, soon subsided.

After a few days it was determined to administer ether, so as to measure the stone, and to determine the best method for its removal. Sir George Porter introduced the lithotrite and seized the stone, which he found to be more than two inches in diameter, and as I held the lithotrite, with the calculus between its blades, I said I thought I could detect a second stone, below and to the right side, but of this I was unable to fully satisfy myself, having failed to get the customary characteristic "click." The patient again suffered from the same symptoms as when the instrument was first introduced, the rigors, however, being more severe.

On carefully considering all the symptoms, and after consultation with Sir G. Porter, I determined to lay open the bladder by the supra-pubic incision.

I performed the operation on the 3rd of May last. I was assisted by Sir George Porter, ether being administered by Dr. Ward. On the previous night the patient had a hip-bath, the pubes was shaved, and the skin over it carefully washed—first with carbolic soap and subsequently with ether. On the morning of the operation, the rectum having been emptied by an enema, an indiarubber bag was introduced into it, and distended with about 10 oz. of water, well heated. The bladder, having been emptied, was thoroughly washed out and afterwards distended with about 8 oz. of a 3 per cent. boric solution, also well heated, and retained by a broad rubber band placed round the penis.

Standing on the right side, with my left hand placed transversely, so as to grasp and steady the fundus of the bladder, I made an incision in the median line 3½ inches in length, terminating at the pubes. The subcutaneous fat and subjacent fascia having been

cut through, the linea alba was exposed and divided; the recti muscles having been separated, the fascia transversalis was reached and carefully divided upon a director.

Very little fatty matter was present, so that the bladder was readily reached. A curved needle, carrying a double layer of carbolised silk, was passed through its muscular coats.

A scalpel, with its back directed upwards, was thrust quickly into the bladder, and an incision about 2¾ inches was made in it. As the contained fluid escaped and the viscus collapsed the peritoneum, containing a coil of the intestine, came into view, but was readily replaced with the left hand. A short lithotomy forceps was passed through the bladder, with which the larger stone, weighing 2 ozs. 30½ grs., and composed of ammonio-magnesian and calcium phosphates, was removed.

On exploring the interior of the organ with my finger, I felt a smaller stone embedded in a sacculus, the aperture of which would hardly admit the point of my index finger. There was a good deal of delay and difficulty in introducing the blades of the forceps into this opening, but, finally, I succeeded in seizing and extracting the calculus, which weighed 159½ grs., and was found to be of similar composition to that first removed.

I closed the bladder wound with a series of sutures composed of fine carbolised silk, and introduced through its walls as far as the mucous lining. I placed a drainage-tube in the wound and a catheter in the bladder. The structures from deep to superficial were separately sutured. The skin wound was dusted over with iodoform and covered with alembroth wool.

The patient suffered from profound shock, from which, however, he quickly rallied. His temperature, which was 101° Fahr. on the morning of the operation, was, at 10 30, 100°, at which it remained until 2 30 a.m., and at 4 30 p.m. it was 99°. On the following morning it rose to 101°, and in the evening was 100·5°. On the third day it registered 102° Fahr., after which it became normal, and so continued until the end.

The urine which escaped through the catheter was at first bloody, but afterwards became quite clear and free from both pus and blood, containing only some ropy mucus, the result of the antecedent cystitis. Its reaction became acid. The inhalation of the ether caused a good deal of laryngeal and bronchial irritation, which, however, soon subsided. The coughing caused thereby produced some pain and inconvenience in the wound.

The catheter acted well, except on the 3rd day, when it became obstructed by a blood-clot, and for a short time the urine escaped through the abdominal wound.

On Saturday, the 7th, the fifth day after the operation, I visited the patient, at about 4 o'clock in the afternoon. His temperature for the two previous days had been normal; he had slept well; was able to take food; stated that he was perfectly free from pain. Altogether his condition seemed as satisfactory as one could expect. Yet within an hour he died quite suddenly from failure of the heart.

After death I examined the wound in the bladder, which I found healed with the exception of about half an inch in the centre. The mucous lining showed evidences of catarrh, which was subsiding. There was not a trace of inflammation, either of the peritoneum or the cellular tissue of the pelvis. The great age of the patient and the weak condition of his heart were of course very much against a successful result; yet he bore the operation so well, and had so far recovered from the effects of it, that it is not easy to say how his death is to be attributed to it.

The case is interesting from the long duration of the hæmorrhage from the bladder (over fifty years), also from the difficulty in recognising the presence of the second stone, as well as in extracting it.

VESICAL TUMOUR REMOVED BY SUPRA-PUBIC CYSTOTOMY.

By FRANCIS T. HEUSTON, M.D., M.Ch., F.R.C.S.;
Surgeon to the Adelaide Hospital;
Lecturer on Anatomy, Carmichael College of Medicine.

[Read in the Section of Surgery, April 13th, 1888.]

CASE.—S. A., aged forty-eight, pensioner from the Royal Irish Constabulary, was admitted into the Adelaide Hospital on 28th February, 1888, suffering from bladder disease, his history being as follows:—He had always been healthy until a period of about four years since, when he was seized by a severe bilious attack accompanied by the passage of urine of a dark colour which he believed to be owing to the presence of blood. Subsequent to this he had no symptoms until April, 1887, when he had a severe pain in his back and found it necessary to micturate frequently, a large quantity of clear urine passing each time accompanied by a severe shooting pain in his left thigh, which ceased soon after the termination of micturition. On May 27th he drove for some miles in a cart with sheep to the fair of Carrickmacross, when he again passed blood, now however in much larger quantity than on the former occasion—that passing towards the termination of micturition being unmixed with urine.

The frequency of micturition and pain now continued until July, when the symptoms passed completely away until September; then he noticed an itchy sensation in the urethra, about an inch from the meatus, and all the other symptoms returned in an aggravated form, it being now necessary to micturate eight to ten times during the day and four or five times during the night, the flow of urine sometimes suddenly stopping, to be again passed when he leaned to the right side. At this time the urine was frequently of a dark red colour. For three months before coming to hospital the symptoms were very much worse, it being necessary for him to micturate hourly day and night. He also suffered from tenesmus and supra-pubic pain, which were much increased by exertion.

The patient presented an extremely emaciated appearance, with every evidence of having lost a large quantity of blood, his condition being such as to show that unless speedy means were taken to relieve his symptoms and give sleep, a fatal issue would occur at an early date. It was now noticed that although a large quantity of blood was passed in the urine it only appeared towards the termination of micturition, not clotted and arterial in its characters.

The urine was alkaline in reaction, sp. gr. 1028, and on resting separated into two layers—an upper, straw coloured and opaque, the lower of a deep pinkish red colour, with a large sediment, composed of red and white blood corpuscles, pus corpuscles, and uric crystals. Albumen was also present to ¼ gr.

On March 9th the patient's bladder was sounded, when a rough condition was felt, with evidence of a solid growth attached to the right wall of the bladder, near its base—the presence of this tumour being verified by rectal examination. The bladder was now washed out with boric acid solution, in the hopes that the sound had separated some of the tumour, when three or four small fleshy masses were washed out, one of which was examined by Dr. Alfred Scott, Lecturer on Physiology, Carmichael College, who reported:—"The small portion, which was removed by a catheter, was frozen and some thin sections made from it. These showed apparent outgrowths of the submucous tissue in the form of exaggerated papillæ, with a fairly even layer of epithelium on them, the structure being undoubtedly a growth of the nature of a benign papilloma, nothing being seen to suggest a malignant character."

During the patient's stay in hospital his health had deteriorated rapidly, and he was most anxious that an operation should be performed. I therefore decided to operate without delay, and on March 15th, assisted by my colleagues, performed the usual supra-pubic operation, passing strong silk ligatures through the walls of the bladder, which I then incised sufficiently to allow of the passage of my finger, when I felt a tumour somewhat larger than an orange, and composed of three distinct lobules attached by narrow pedicles to the right wall of the bladder at about the junction of its lower with upper two-thirds, in addition to which a number of smaller growths, about the size of hazel nuts, were attached to different portions of the bladder wall.

The larger tumours were seized by Sir Henry Thompson's tumour forceps and removed, while the smaller ones were removed

by the finger, they separating readily. I should here state that when the larger tumour was removed the fluid was allowed to escape from the rectal bag to such an extent as to allow the bladder walls to regain their normal position. The hæmorrhage, which was very severe, was at once controlled by the application of a solution of tannic and gallic acids, when the bladder was fully explored by an electric light, in order to ascertain if all the tumour was removed. The bladder was then douched with a weak solution of hazeline, until the fluid returned clear. The opening into the bladder was now united by silk, applied after Lembert's method, and a drainage-tube introduced, subsequently to which further sutures were passed through the superficial layers of the bladder wall and abdominal aponeurosis inferiorly, in order to close the space of Retzius; while superiorly and laterally similar sutures attached the bladder to the sheath of the rectus. A No. 12 catheter was passed into the urethra, and the wound dressed.

March 16th.—Patient slept well. M. T., 100°; pulse, 100. Bladder washed out from catheter through drainage tube with 4 per cent. solution boric acid. Slight tenderness on pressure over the pubis. Takes nourishment (beef-tea peptonised, and wine-whey) well. Tongue moist and covered with a whitish fur; bowels not moved. The bladder was again washed out in the evening, and 6 tablets of saccharine (½-gr. in each) ordered to be taken within twenty-four hours.

The daily notes show that the patient progressed very favourably, the highest temperature recorded being 101·6° F., the urine becoming acid in reaction, and no hæmorrhage occurring. The wound was dressed twice daily, the bladder being washed out with boric acid solution at each dressing, and nourishment being well taken. This continued until the evening of March 26th, twelve days after operation, when the temperature rose to 104·2° F., and delirium of a muttering character occurred. Quinine being administered, the temperature fell, on the 27th, to 100·4° F., but the patient did not rally, and he died, in a condition of asthenia, on the evening of March 30th, sixteen days after operation.

An autopsy was performed on March 31st by Dr. Bewley, Pathologist to the Adelaide Hospital, who sent me the following report:—

"*Post mortem* done through the wound, enlarged; hence not complete; not possible to examine liver, lungs, &c. No peritonitis; no fluid in abdomen; bladder united to wound; no opening into

abdominal cavity; wound not healed, but healthy looking; bladder contracted; anterior wall normal; posterior wall 1¼ inches thick, cutting hard and grating; posterior surface rough with warty excrescences, which were moderately soft. In centre of surface a space, size of a half-crown, covered with white flocculi of seemingly gangrenous tissue. This was the seat of the removed papilloma. Under water it presented a fringed appearance. The posterior wall was infiltrated with yellowish-white material, which, on scraping, yielded abundant milky juice. Spleen healthy. Kidneys healthy; no evidence of septic infection. Wall of bladder cancerous."

Dr. Scott also furnished me the following:—

"I have since the operation examined more fully one of the small tumours removed from the bladder. To the naked eye it was nearly spheroidal, about two centimetres in diameter—one part being somewhat flatter—and has a small circular portion, about 3 millimetres in diameter, being the only portion attached to the bladder wall.

"The whole tumour seemed formed of a mass of little villous-like growths, about 3 to 5 millimetres long, and half a millimetre in breadth.

"This was hardened, and sections cut through the surface of attachment, and as nearly as possible through the centre of the tumour.

"These sections show a structure as before described—papillæ from the submucous tissue, covered by the epithelium of the bladder. In some parts the whole thickness of the epithelium is visible and is normal; in others slightly thickened; but in others it has been eroded by the handling during the operation.

"The epithelium has nowhere the characters of epithelioma, the growth being essentially a lateral increase of the epithelium on the connective tissue, in which in places a few leucocytes are visible, probably connected with the rapid growth of the connective tissue."

Remarks.—Operations for the removal of vesical tumours are sufficiently rare to excuse my bringing this case in detail before the Academy, this being a field of surgery very much neglected until the researches of Sir Henry Thompson, whose latest recorded cases amount to the total of 34 patients on whom he has operated. He states that the first case is that of Covillard, of Lyons, who in

1639 removed a tumour by the lateral lithotomy incision, while the first supra-pubic operation is that of Billroth, in 1874.

I believe this to be the first case operated on in Ireland, and I consider the points of most interest in it to be—the distinct evidence of tumour within the bladder before operation, as also the localisation of the position of the chief tumour by the symptoms. As to the question of malignancy, the only point tending towards that supposition prior to operation was the fact that the tumour was to be felt from the rectum. All the other evidences—history of four years' slight pain, absence of glandular engagement, &c.—pointed towards the presence of a fibro-papilloma of large size and broad attachment to the wall of the bladder. Dr. Bewley's examination shows that there was malignant growth in the wall of the bladder, while Dr. Scott's as conclusively shows that the actual tumours, great and small, presented no evidence of malignant growth, being fibro-papillomatous throughout. That this—a fibro-papillomatous tumour, with cancerous infiltration of the wall of the bladder—is a very rare condition, is shown by the fact that only one such case is to be found amongst those published by Sir Henry Thompson, and should not therefore be laid too much stress on in the question of the advisability of operation.

In respect to the operation to be advised, I do not consider, where distinct evidence of large growth exists, there is any advantage to be gained by the perineal incision, so useful in the hands of Sir Henry Thompson, as, if the walls of the bladder be attached to the surrounding tissues in such a manner as to close off the areolar space in front of the bladder, there is but very slight chance of extravasation, which I look on as being the chief objection to the urine passing through the supra-pubic incision, which is fully shown, in the examination of my case, not to have occurred.

As to any objection to the attachment of the anterior—or, properly speaking, inferior—surface of the bladder to the abdominal parietes, hindering proper contraction of that viscus subsequently, I consider the very slight movement of that surface of the organ in the normal condition to be such that this slightly closer adhesion

can make no practical difference in the ability of the viscus to fully contract.

Death occurring at such a remote period after operation (16 days), I look on as being due to the inability of the system to withstand even such a transient attack of urinary fever, owing to the extremely exhausted condition of the patient before operation, macroscopic and microscopic examination showing no evidence of septic infection.

PENETRATING WOUND OF THE ABDOMEN.

By THOMAS DONNELLY, M.D., F.R.C.S.;
Assistant-Physician to the Richmond, Whitworth, and Hardwicke Hospitals.

[Read before the Section of Surgery, May 11, 1888.]

"Wounds that penetrate the cavity of the abdomen," says Erichsen, "are of especial interest on account of the frequency with which they are complicated with peritonitis, and with injury of the viscera. They may, for practical purposes, be divided into—1st, those that penetrate the peritoneal sac, without wounding or causing the protrusion of any of the contained organs; and 2nd, those that are complicated with protrusion or wound of some of the viscera."

The case which I have the honour of bringing under the notice of the Royal Academy of Medicine falls under the latter head.

Protrusion of uninjured intestine, mesentery, or omentum, may take place through the wound in the abdominal wall. The protruded mass is always very large in comparison with the aperture from which it escapes, the sides of which, being overlaid by it, constrict it rather tightly, so as to form a distinct neck to the protrusion. If left unreduced the mass speedily loses its polish and bright colour, becoming dull and livid from congestion. It then inflames and soon becomes gangrenous from the pressure exercised upon it by the sides of the aperture through which it has passed.

In replacing the protruded parts, whether by aid of incision or not, care must be taken that they are fairly put back into the cavity of the abdomen, and not pushed up into the sheath of the rectus or into the subserous areolar tissue lying before the peritoneum, an accident that would be fatal by allowing constriction of the neck of the protrusion to continue unrelieved.

In accidents of this kind, and also in operations, I believe too much rough handling of exposed parts takes place, as a rule, thereby causing injury to delicate structures quite unaccustomed to ill-usage, which are by nature well protected against external violence.

In this case I attribute the remarkable recovery in a great measure to the extreme delicacy with which the bowel was treated, together with the protection afforded it by the hot, moist lint, which likewise maintained the normal temperature of the viscus.

The circumstances surrounding this case were the reverse of what would be desired by surgeons in these days of antisepticism. They were briefly these:—

A dancing party was in the height of its enjoyment shortly after midnight in a drawingroom, the windows pushed up as far as possible, to permit the entrance of air to the room, heated to excess by burning gas and a crowd of ladies and gentlemen dancing. The hero of what fortunately did not become a tragedy, although having partaken plentifully of good things during the evening, rushed across the room in pursuit of a plum thrown into the air by one of the guests, stumbled, and fell through an open window, the window-sill being only about a foot high, and was impaled on the iron railing beneath.

Case.—A few minutes before 1 a.m., on August 31st, 1886, I was called to attend A. M., a fine healthy boy, aged nine years, who had fallen a height of about ten feet from an open drawingroom window on to the railings outside the hall-door, one of the spikes of which penetrated his abdominal cavity. On his being removed from off the railings part of his intestines protruded through the wound.

The accident occurred about half an hour before I was summoned. When I arrived the boy complained of intense abdominal pain, and resisted even very gentle manipulation of the intestine so much that Surgeon O'Farrell, who was present, concurred with me in the advisability of administering chloroform before making an effort to effect reduction of the hernia. Whilst waiting for the chloroform to be procured and administered—about three quarters of an hour—I covered the protruded intestine with a large piece of

lint squeezed out of hot water, to prevent its getting chilled and to protect it from dust. When the boy was fully anæsthetised I carefully examined the wound, which was less than an inch in diameter, situated about two inches above the middle of Poupart's ligament on the right side. Protruding therefrom was a piece of small intestine, with attached mesentery, about the size of a clenched fist. It being found impossible to reduce the bowel after a few minutes' delicate manipulation, I determined to enlarge the opening to facilitate reduction. The outer angle of the wound appeared to offer the greatest obstacle to reduction, hence I cut in an outward direction through the abdominal wall for about a quarter of an inch, but found, on again endeavouring to replace the bowel, that the only improvement effected was by enlarging the opening to show that the inguinal direction of the wound must have been downwards and inwards, toward the spine of the os pubis. Before proceeding further with the description, I should mention that the boy vomited a large quantity of cakes, sweetmeats, &c., which he had eaten during the evening. While the patient was retching, the protruded bowel became distended, and a tumour extending from the external abdominal ring on the right side to the cutaneous wound became evident.

Following the hint which this swelling gave, I raised the superficial structures at the internal inferior part of the wound on a director, taking every precaution to avoid wounding any branches of the superficial epigastric artery, and enlarged the opening about half an inch, then separated the deeper structures, including the peritoneum, with my fingers. After some time, with gentle manipulation, assisted by Surgeon Elliott, who had now arrived also, I succeeded in returning the bowel to the abdominal cavity. A small quantity of clear peritoneal fluid escaped from the abdomen, but scarcely any bleeding occurred.

The intestine, when reduced, was swollen and congested, but had not lost its glistening appearance. Having satisfied myself that the intestine was really in the abdominal cavity, and not in a *cul-de-sac* outside the peritoneum, I put one suture in the centre of the opening through the deep structures, including the peritoneum, leaving one end of the silk thread hanging out of the wound at its most dependent part, and secured to the skin by a strip of strong surgeon's rubber plaster. Four superficial sutures were then inserted, after which the wound was washed and dried. A compress of lint soaked in tr. benzoini co. was applied, and retained

in position by strips of plaster and a spica bandage—a broad roller bandage round the abdomen securing all outside. Before recovering from the chloroform the boy was removed from the sofa in the drawingroom—on which he lay since the accident occurred—and placed in bed with a pillow under his knees to keep his thighs flexed on the abdomen. His pulse had by this time recovered tone, and as he was still in a quiet sleep I left him about 3 a.m., having ordered half a wineglassful of water occasionally if thirst was distressing, also

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August 31st, 9 45 a.m.—Temp., 100·4° F.; pulse, 120 per min.; tongue slightly furred and moist. The patient was very bright, and complained of thirst, but not of pain or other discomfort. Draughts to be continued, half a wineglassful of water occasionally, nothing else allowed to be given.

5 p.m.—Temp., 100·4° F.; pulse, 122 per min, full and strong. Patient complained of thirst, but no other discomfort; was very sensible and tranquil. During the day he voided a small quantity of dark muddy urine. There was tenderness on pressure over the bladder and seat of injury; very slight tenderness on pressure at any other part of the abdomen.

10 p.m.—Temp., 100·4° F.; pulse, 120 per min.; tongue slightly furred, but moist. The patient complained of intense thirst and pain in abdomen; he was restless, with an anxious expression of face. There was marked tenderness over right inguinal canal, extending up to and around the wound. The draughts were continued every fourth hour. Half a wineglassful of water only was allowed occasionally.

September 1st, 9 30 a.m.—Temp., 100·2° F.; pulse, 114 per min. The patient had been restless during the night, his bowels moving twice in the intervals; the urine was normal in appearance. The boy was tranquil, he did not complain of pain, and did not feel so tender on pressure as on the previous night. The wound was exposed, but there was no pus to be seen; it was then washed and dressed as before. Allowed half a wineglassful of milk occasionally. The draughts to be given if required.

4 30 p.m.—Temp., 100·2° F.; pulse slower; vomiting occurred once during the day, hence the milk was discontinued and water

only given. Tenderness on pressure was less, no pain complained of by patient.

2nd, 9.45 a.m.—Temp. normal; pulse, 84 per min.; very slight tenderness and no pain complained of. The patient was bright and cheerful, and asked for some food. He had slept all night without having taken a draught. I removed the superficial sutures, leaving in the deep one, which was quite firm still, and placed strips of adhesive plaster across the wound to prevent any tendency to gaping. The edges had united almost completely by primary union. There was very slight sero-sanguineous discharge, but no pus. The wound was then dressed with dry lint, and a spica bandage applied.

5 p.m.—Temp. normal; pulse, 82 per min. The child was tranquil, free from pain, complaining only of hunger. His bowels were moved once naturally during the day. He was allowed half a teacupful of milk with a teaspoonful of lime-water every third hour.

3rd, 12 15 p.m.—Temp. normal; pulse, 82 per min. The child was bright, and complained only of hunger, was beginning to object strongly to the enforced fasting. The bowels acted naturally in the morning; urine normal; no medicine was administered; half a teacupful of milk was ordered to be given every second hour, and half a wineglassful of chicken jelly twice in the day.

4th.—Temp. and pulse normal. The child was cheerful. Only liquid food was given. During the following six days the wound was dressed with lint and oil. Liquid food only was given.

10th.—The deep suture on being gently pulled came away with merely a trace of pus. The wound was dressed as before.

12th.—The patient was very bright, and mending rapidly in health, but complained of only being allowed slops, so that some beefsteak was added to his rations.

17th.—The wound had practically healed. The boy sat up with a broad belt, having a pad three inches in diameter placed over the cicatrix of rent in abdominal wall, protected by a piece of lint soaked in olive oil. The boy continued to improve, and as there was no tendency to hernia, he was allowed to move about on September 17th, with a broad belt around his abdomen.

This case I thought would interest the Academy because of—

1. Recovery, following exposure and constriction of the intestines of nearly two hours' duration.

2. The thoroughly aseptic course taken by the process of healing, although the accident happened and the bowel was returned to the

abdomen in an atmosphere impure with human exhalations and laden with dust; the slight localised peritonitis; no antiseptic precautions other than extreme cleanliness and care being used.

3. No tendency to ventral hernia one year and a half after the accident.

4. The minute dose of opium required to control the peristaltic action of the intestine and allay pain.

ENTERECTOMY AND ENTERORRHAPHY.

By J. S. M'ARDLE, F.R.C.S., &c.;
Surgeon and Lecturer on Surgery, St. Vincent's Hospital;
Late Senior Demonstrator, Catholic University Medical School.

[Read in the Section of Surgery, May 11, 1888.]

The subject to which I desire to call attention this evening is of such importance, and its bearings are so numerous, that I cannot hope to deal with it adequately in the time at my disposal.

Before entering on the subject proper of this paper, I wish to refer to a case of mine which demonstrates the value of resection and suture:—

Case.—The patient, a lad of sixteen years, came under my care in St. Vincent's Hospital on the 15th November, 1886.

Previous History.—In the December of 1885, after jumping from a cart on to a paved road-way, he experienced very severe pain in the right inguinal region, which necessitated his removal to bed, where he remained for three weeks. During this time he suffered from intense pain over the right inguinal region, extending upwards and inwards to umbilicus. Under treatment the pain subsided, and early in the fourth week he was allowed up; but pain coming on with increased severity, he was obliged to return to bed, where he remained until May, 1886, when he went to the country. In the end of May he was obliged to again seek surgical aid in Dublin, as he found a small painful swelling appearing above the middle of the iliac crest. This swelling was poulticed for fourteen days. On incision it discharged a mixture of fæces, pus, and blood. The wound closed and swelling reappeared, and opened spontaneously, giving exit to fœtid pus. This discharge continued, but the intense abdominal pain disappeared. In October, 1886, he experienced a slight return of the pain, and after a few days the discharge, which had decreased, came freely again, but stained with bile. About this time he suffered greatly from cramps in right leg and severe pain running from groin to knee.

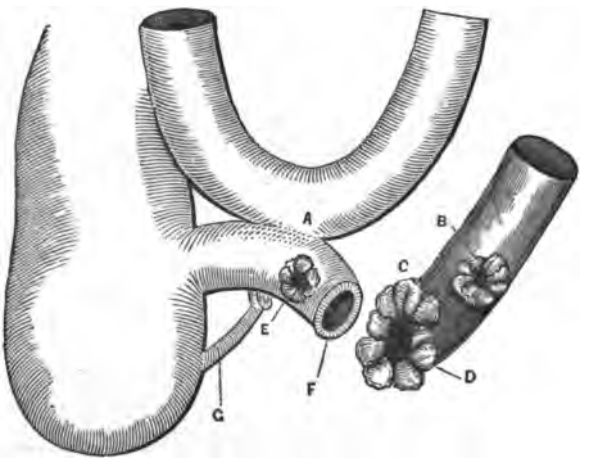
Condition on Admission.—He was pale and emaciated; face drawn and anxious; pupils dilated; pulse, 120; temperature sub-normal; feet and hands cold and clammy; urine normal in amount and appearance; no albumen; tongue coated with white fur; occasional vomiting of bile-stained fluid. He suffered from constipation, and complained of severe pain passing from right groin down thigh as far as knee. Right leg and thigh were greatly wasted. Above the middle of the iliac crest I found a fistula capable of admitting the point of the little finger, and leading into the right iliac fossa. Along this a probe passed readily as far as the edge of the true pelvis. A slight swelling appeared above the outer three-fourths of Poupart's ligament, and backwards to fistulous opening. It was semi-elastic, dull on percussion, and extended towards umbilicus. The fistula discharged large amounts of curdy pus, containing all the solid particles of his food, and having a yellow colour and sour odour. He weighed on admission 6 st. 5 lbs.

On December 12th I made an incision along the iliac crest, five inches in length, and removed a large amount of fungous granulation tissue, scraping the iliac fossa with Volkmann's scoop. I laid in a very large drainage tube, applied antiseptic dressings, and had the patient removed to the ward. Nutrient enemata were administered, and he was not allowed anything by the mouth. The dressings were changed on the third day, and the discharge was found to be very slight and a mixture of pus and blood. For three weeks he was kept in the recumbent posture and nourished by enemata. In the fourth week he was allowed liquids by the mouth, and, as no discharge occurred from the fistula, the enemata were now discontinued, and the patient was allowed up. In a few days he was able to go to the Convalescent Home at Linden, where he rapidly increased in weight and strength, until, while making some violent exertion, he felt a severe pain in his side; and when the time for dressing the wound came it was found that the peat-moss pad was covered with the bile-stained contents of the intestine. The discharge now increased. The tract from the intestinal opening to the skin-wound discharged pus in considerable amount. Under this strain his health again failed, and he came under my care in St. Vincent's, where, after washing out the sinus and again enforcing rest and using rectal nourishment, the discharge decreased and his strength improved. My object in this second attempt at strengthening him was to have him fit for operation, the steps of which I shall now detail, remarking however, beforehand that this opera-

tion was not undertaken until the patient and his friends, seeing the miserable condition in which the fistula kept him, insisted on my vigorous interference. Placing before them the most gloomy picture of his prospect, I proceeded as follows, on March 10, 1887:—

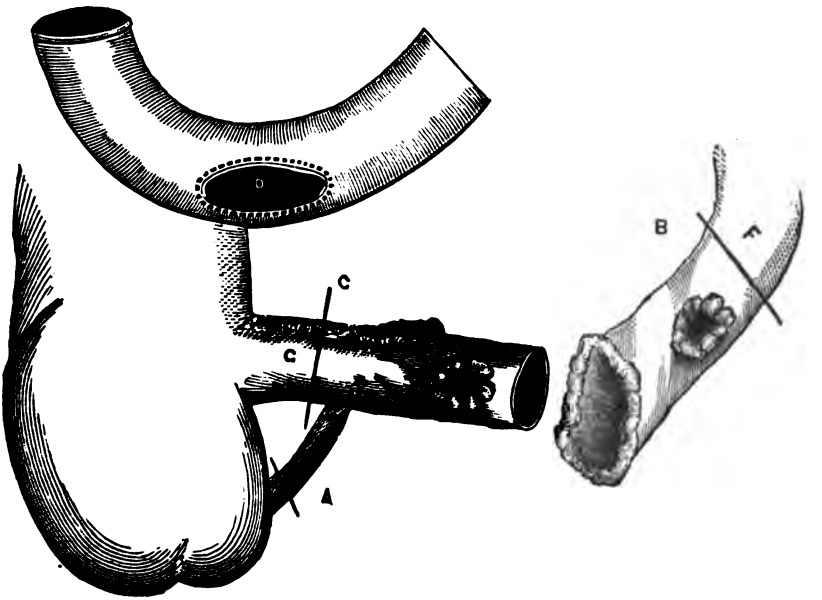
An incision was made seven inches in length, extending from about two inches above the anterior superior spine of the ilium obliquely downwards and inwards to one and a half inches above the middle of Poupart's ligament. The incision was carried down to the peritoneum, which was pushed inwards and upwards, so that I might discover the orifice in the bowel. Here I had some difficulty; the tissues were infiltrated with fungous granulation material, and sinuses burrowed in all directions, so that it was impossible to determine the exact seat of the fistula. To solve the difficulty I introduced a mixture of dilute carbolic solution and milk into the bowel by means of a siphon, and, after a considerable amount had entered, I discovered a large stream passing into the iliac fossa at its innermost part; and examining this region carefully, I detected an orifice capable of admitting the index finger readily, and, seeing that no extra peritoneal operation could be of service, I incised the peritoneum along the line of abdominal wound, having first passed a large drainage tube through the anterior wound and out at the opening above the crest. This served to draw away the milky fluid, which continued to pour from the fistula.

Fig. 1



On opening the peritoneum I found a coil of small intestine lying in front of the cæcum, which was distended and fixed to the ileum, opposite the attachment of the vermiform appendix, as depicted at A, Fig. 1. On raising this coil of intestine, and separating it from the ileum with the handel of a scalpel, it was found that an opening existed between the two coils at the point of attachment at A, Fig. 1. Bringing the perforated part of intestine, D, Fig. 2, through the wound, I resected an elliptical ring from the margin of the perforation, shown by the dotted line round D, Fig. 2, closing the wound thus refreshed with Lembert suture, as at C, Fig. 3. I pressed the coil (which was slightly narrowed by the suturing) upwards into the abdomen, and retaining it there with a large flat sponge I examined the cæcum, and found it healthy. The vermiform appendix was imbedded in a mass of tissue which I discovered binding down the

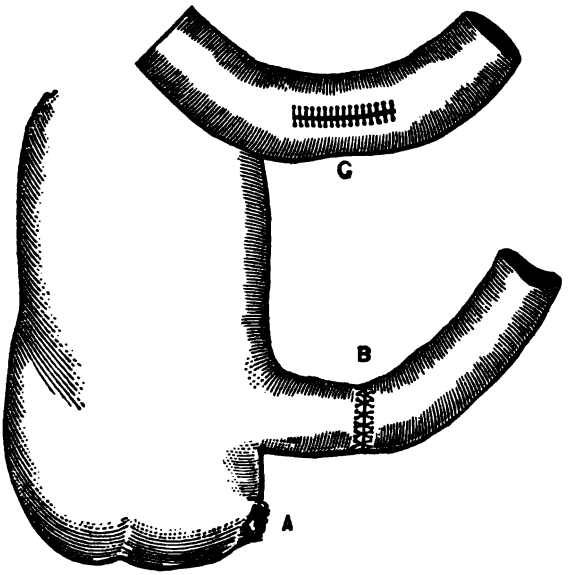
Fig. 2.



ileum to the pelvic wall. I removed the appendix near the base, as at A, Fig. 2, and, inverting the edges, closed the opening by three Lembert sutures. The ileum was firmly fixed to the edge of the true pelvis, and on examining this coil of intestine carefully I found

that it was extensively diseased. Six inches from the ileo-cæcal valve a perforation existed, as at B, Fig. 1, capable of admitting the handle of the scalpel, and from this a channel existed through fungous tissue into the false pelvis; half an inch nearer the valve the ileum was completely severed, as at C, Fig. 1, its proximal part, which was enlarged, opening by a trumpet-shaped orifice, capable of admitting two fingers, into a large irregular channel leading to the lumbar fistula. The mucous membrane was greatly thickened and everted, and thrown into radiating folds, as shown at D, Fig. 1. The piece of ileum remaining attached to the large intestine was very firmly fixed to the pelvic wall, and two inches and a half from the valve a lateral opening existed in it, as at E, Fig. 1, capable of admitting one finger. The mucous membrane protruded through this opening, and presented as a fringe on the outside of the bowel.

Fig. 3.



The opening of the small piece of ileum, represented at F, Fig. 1, was very narrow; the mucous membrane did not project through it, as at D. This was the most adherent part of the intestine, and to its lower border, as shown in Fig. 2, the vermiform appendix was attached. I now broke down the adhesions which bound the diseased

parts to the edge of the pelvis, securing vessels with forceps, and raising the proximal end of the ileum to the wound, I ligatured the mesenteric vessels by passing an aneurysm needle with a double catgut ligature under them. I then cut the mesentery between the ligatures, and severed the bowel one inch from the lateral opening, as at B, Fig. 2. A similar process was adopted with the mesentery of the distal portion of the ileum, which I removed one inch from the ileo-cæcal valve, as at C, Fig. 2. I now closed the mesenteric notch, brought the parts F and G together with deep and superficial catgut suture (Czerny-Lembert), and, thoroughly cleansing the parts, closed the abdominal wound with deep and superficial suture, as at B, Fig. 3, and passed a large drainage-tube from its upper angle out through the opening above the iliac crest. The wound was sprinkled with iodoform and the ordinary carbolic dressing applied, a peat moss pad being placed over the neighbourhood of the fistula. The operation was conducted under the spray, and in the theatre, at a temperature of 70°.

Immediately after operation the patient was removed to the small ward off the theatre, and a rectal injection of egg, beef-tea, and liq. pancreat. (Earl) administered. In half an hour afterwards he had ¼ gr. of morphin hypodermically. His temperature in the evening was 99·2°. At 6 30 he was dozing quietly. At 10 30 p.m. a second nutrient enema was administered. At 3 a.m. on the 11th another, and also a hypodermic of ¼ gr. morphia. At 10 a.m. on the 11th the note is—"Slept for six hours during the night; passed water twice since operation; temperature, 98·2°; pulse, 132; tongue moist, with soft white fur at base; slight pain in abdomen, which is distended and tympanitic." Three enemata were given during the day and two hypodermics of morphia. In the evening the temperature was 98°; pulse, 130, very feeble. At 11 p.m. enema, as before-mentioned, with the addition of a dessert-spoonful of brandy, is given, which is retained, and morphia is administered, as on previous night.

12th.—Slept well during the night; pulse 120, weak and compressible. Suffered from vomiting of clear acid fluid stained with bile. This greatly distressed him. A mustard leaf was applied to the epigastrium, and a small dose of dilute hydrocyanic and sulphuric acids was administered, which effectually stopped this unfavourable symptom. He complained of severe pain over wound, extending towards umbilicus.

13th.—Slept five hours; no vomiting; pain in abdomen much

less; tenderness still present; no motion from bowels. Enemata continued, and morphia. Pulse, 130; temperature, 97°.

14th.—Wound dressed, alternate sutures removed; slight discharge of pus from fistula and from drainage-tube in wound; no vomiting; slight motion from bowels, and discharge of flatus. The patient called my attention to a swelling above the line of incision, which disappeared before each escape of flatus, and as it was disappearing he experienced a sharp pain deep in the wound. Pulse, 100; temperature, 98·2°.

15th.—Slept well during night; copious motion from bowels; no vomiting; abdomen flat; tenderness much less; pulse, 100; temperature, 98·4°.

16th.—Wound dressed; there is a slight trace of bile in the discharge, and on removing dressings some bubbles of gas escaped; no pain or tenderness. Pulse, 96; temperature, 98·6°.

From this date the patient made an uninterrupted recovery, the temperature never going above 98·6°, the pulse gradually diminishing in frequency, until on the 21st, when, the wound being quite healed except at site of drain, he was allowed up. Liquid nourishment was first given by the mouth on the 17th and on the 25th—that is, fifteen days after the operation—he was allowed bread with essence of meat. He rapidly increased in weight, and left the hospital at the end of May, weighing 8 st.—his weight before operation being, as above-mentioned, 6 st. 5 lbs. He now weighs 8 st. 7 lbs.

Before referring to the statistics of this operation, there are some points in reference to the above case which are deserving of notice. First, the course taken by the contents of the intestine was peculiar. Instead of passing downwards to Poupart's ligament, and presenting above that structure, as in most cases, they passed under the cæcum, and, turning over the iliac crest, pointed near the edge of the quadratus lumborum. Second, it is unusual to find so many openings exist in the bowel without exciting suppurative peritonitis; and third, the effort of nature to relieve the bowel, as shown at A, Fig 1, is remarkable. Here adhesive peritonitis allowed perforation to occur without extravasation, and with the effect of re-establishing the continuity of the intestinal canal, when the abscess obstructed the ileum at F, Fig. 1. It is

also worthy of remark that the suturing caused a temporary narrowing of the intestines, as evidenced by the condition produced by flatus passing through the bowel, as noted on the 14th.

The enterectomies recorded are now sufficiently numerous to permit of a fairly accurate estimate being made of the value of the different methods of restoring the continuity of the intestinal tract. They number, as far as I am aware, 215. A review of those cases, and of their results, affords ample opportunity of studying the circumstances under which this proceeding is likely to prove successful, the dangers to be provided against, and the most satisfactory way of carrying out each step of the operation.

Section A.—Taking first the instances of resection for gangrenous hernia, we find that of 76 cases, 41 died; 11 from yielding of the sutures; 8 from exhaustion; 2 from carbolic acid poisoning; 2 from asphyxia; 12 from septic peritonitis; 3 from simple peritonitis; in the others the cause of death is not noted. Now, a study of these cases will show on what this high death-rate depends. Of the 11 cases in which the sutures yielded, in 4 the fatal result was brought about by an overloaded condition of the bowel; in 3 it was due to imperfect suture; and in the remaining 4 to the low vitality of the bowel at the suture line, one of them having the mesentery detached for half an inch. In most of the cases death resulted from extravasation and septic peritonitis.

Of the 12 instances of septic peritonitis without perforation, 7 were examples of long strangulation, the bowel being inflamed and softened for a considerable distance beyond the seat of gangrene; in 3 fæces escaped into the abdomen during the operation; and 2 of the 3 died rapidly of septic intoxication. In the other 2 the fatal result was due in part to lengthened exposure of the peritoneum during the operations, which lasted nearly three hours. Of the 8 cases which died of exhaustion, 3 were in a state of great prostration before the operation; in 3 the operation was tedious owing to delay in breaking down of adhesions; while in the other two instances the patient lived only a few hours after operation. Two of the 3 cases of simple peritonitis resulted from the operation; 1 arose from indiscretion in feeding. The cases of

asphyxia and of poisoning were accidents which may attend any prolonged operation, and so need not engage our attention here.

The question now arises—What percentage of these cases are due to causes over which we have control? More than one-fourth of all the cases died of troubles arising from yielding of the sutures. By eliminating the causes of this perforation we should be able to reduce the mortality considerably. The causes, as above shown, are—1st. Suturing through diseased tissue. 2nd. Faulty suture material, or its improper application. 3rd. The return of overloaded coils of intestine. 4th. A separation of the mesentery from the bowel. Each of the above causes we can largely control, as I shall mention hereafter. The deaths from septic peritonitis, numbering as they do more than 40 per cent. of all the deaths from this operation, will become fewer when we learn to operate before septic absorption has commenced, and when we avoid undue exposure of the peritoneum, while deaths from exhaustion will entirely disappear from the list if we hearken to the words of Chauvel, who, in speaking of enterectomy for injury, said—"Either operate early, or if you have allowed the propitious time to pass by, abstain from all surgical intervention."

Section B.—Resection for intussusception has been performed 13 times, and on only 3 occasions with success. In 4 cases which succumbed, death resulted from gangrene of the suture line, due to suturing inflamed tissue. In 3, septic peritonitis without perforation occurred. In 2, death arose from exhaustion in a few hours after the operation. One case was pulseless during the last minutes of the operation, and died while being carried to bed. It would be very unfair to ascribe this high mortality to the inherent dangers and difficulties of the operation, since some of the cases recorded could not have withstood even a trivial operation.

The histories of these cases show that surgical intervention to be effective must be early.

Of the other cases of acute obstruction treated by resection, 6 in number, 4 died; 1 recovered completely; another with a fæcal fistula. This gives a total of 95 cases of resection, with 54

deaths; and I doubt if this represents the actual mortality after this serious operation. I fear that many of the failures met with in this branch of surgical practice are not recorded, and so I would be inclined to look upon the above as the bright side of the picture of surgical prowess in dealing with acute intestinal obstruction.

It will be seen from the above list of operations conducted for the relief of acute intestinal obstruction that a very high mortality attends all attempts at resecting and immediately suturing the bowel. That such should be the case is not to be wondered at when we consider the state of things existing at the seat of disease, and acting injuriously on the entire system.

Taking first the instances of resection for gangrenous hernia, we find that 41 of 76 died, most of them within a week of the operation, and either from opening of the sutures, septic absorption, or suppurative peritonitis.

M. Bouilly, in his able article on "Enterectomy," says that resection and suturing of bowel for gangrene is not only authorised but indicated. He takes care, however, to safeguard this opinion by enumerating the conditions under which it should be done, but such conditions are very rarely present when gangrene sets in. Dr. Carl Koch, in a very instructive article on this subject,* says:—"I must confess that neither heretofore nor in my present practice was I ever tempted to do primary resection in gangrenous hernia. I always construct an abnormal anus, with the intention of removing it by operation afterwards." And why avoid this immediate suturing of the bowel and closing of the abdominal wound? The answer is found in another part of the same article, and may be briefly stated as follows:—

1. The patient is already broken down, the severe pain and vomiting due to strangulation greatly weakening the heart, as shown by a miserable pulse.

2. The operation, necessarily tedious, requires a protracted chloroform narcosis, producing a collapse from which many patients never rally.

* Deutsche Zeitschrift für Chirurgie. March, 1886.

3. The very marked inflammatory changes about the gangrenous part render suture and return of the bowel a very dangerous proceeding, since, as shown by many of the cases noted, gangrene of the suture line and perforation occur.

4. Septic peritonitis may arise from introducing into the abdomen a piece of intestine in a state bordering on gangrene.

It may be argued that the intestine may recover when gangrene has almost set in if returned to the abdominal cavity. This fact is undoubted, but it is only in the absence of a cutting operation on the bowel. But when the intestine is so far impaired that its return into the abdomen is unsafe, and its removal becomes necessary, we usually find it thickened and inflamed for a considerable distance beyond the gangrenous part, as well as being surrounded and infiltrated with a sepsin-holding fluid, which is (especially in the presence of a cutting operation, and in a patient exhausted by a protracted chloroform narcosis) capable of producing septic intoxication and rapid death.

And this applies alike to all cases of acute intestinal obstruction in which gangrene is present. From the results above noted, and from my experience of cases of gangrenous hernia, I certainly concur with Koch in saying that in all cases of gangrenous hernia and in intussusception, when the bowel is greatly inflamed, a false anus should be formed, leaving the suturing of the bowel for a future operation, when its walls have become healthy. Even in a healthy bowel the suture line occasionally sloughs, leading to perforation and peritonitis; how much more readily and frequently will an inflamed and softened tissue yield and produce a fatal result. A point of very considerable importance in reference to this immediate resection and suturing is the danger of breaking down adhesions which may have formed at the abdominal ring, and would prevent, if left alone, all danger of extravasation. The result of rupturing these attachments is seen in an instance brought before the Surgical Society of Paris by M. Bouilly, and referred to elsewhere in this paper. In this case digital examination of a fæcal fistula broke down peritoneal adhesions, and the patient died of septic peritonitis in twenty-fours after.

Recently I have heard and read of the advisability of suturing the bowel immediately after resection—that the mortality attending the combined operation does not exceed that which attends the procedures when conducted separately. The following figures show the fallacy of this statement:—Of 36 cases of gangrenous hernia, in which an artificial anus was formed, only 9 died; in 14 the enterotome was used, with 1 death; in 5 resection and suture, with 1 death; in 3 partial resection, all successful; 3 healed spontaneously. In 1 the fistula was not interfered with. That is, 11 out of 36 succumbed to the slower method Now of 76 cases in which immediate resection and suture was adopted, 41 died.

There are, therefore, at least three reasons for dividing the operations for gangrenous hernia into two stages—1st, the much better chance of an immediate good result; 2nd, the prospect of spontaneous closure of the artificial anus; 3rd, the chance of being able to close the fistula by a skin-flap, or by Dupuytren's enterotome.

Much that has been said in reference to hernia will hold good in speaking of intussusception, since the conditions resemble each other so much. Up to this the results of resection have been very unfavourable. This is, I think, owing to the delay in operating arising from fruitless efforts at reduction of the invagination, and to the time allowed to elapse before operation is attempted. In irreducible invagination immediate resection must, as a rule, be done, since the ensheathed piece of intestine will slough off and give rise to septic peritonitis if left in the abdominal cavity. Whether complete suture should follow the resection of the bowel, or an artificial anus be formed, is still doubtful; I would be in favour of leaving free exit for the intestinal contents.

Section C.—We next come to study the value of enterectomy and enterorrhaphy in cases of chronic intestinal obstruction arising from cancer or other causes. The following are the results in 26 cases which I have collected, with the object of estimating the real worth of these operative procedures:—7 were for simple stricture, with 3 deaths; 19 for malignant disease, with 11 deaths. Most of the cases died with pyæmic symptoms. Five of those

operated on for malignant disease had secondary deposits in the deeper organs, while 3 of them were already greatly broken down by hæmorrhages and inanition. Many of the resections here were only of small portions and not engaging the mesentery, and until a list of many complete resections is made accurate conclusions cannot be arrived at.

I have purposely omitted from the above number all mention of pyloric and rectal stricture, as I have already called attention to the results of pylorectomy[a] and excision of the rectum.[b]

The above records are somewhat disappointing, but when we consider the circumstances under which many of the operations were performed we are obliged to admit that the results are good. For instance, in some of them no preparation was made for resection, and, as we shall see hereafter, much depends on carrying out well the details of the operation. In others the position of disease protracted the operation, while in not a few the patients were already in a pyæmic condition before the operation.

As far as I can see, from the histories of cases before me, there is no need for making a false anus unless the patient is much broken down, ulceration exists above the seat of stricture, or there is acute obstruction. In the first instance a protracted operation would lead to a fatal result, and in the second and third the bowel wall would yield and death occur from peritonitis. In most chronic obstructions resection and immediate suturing are advisable, but enterectomy or colotomy is preferable to resection in acute cases; because, first, the patient is prostrate and unable to bear a lengthened operation; second, the intestine is unfit for a plastic operation, owing to the infiltration of its walls with lymph and fœtid pus. While no case of recovery is recorded after resection in acute obstruction due to stricture or cancer, Van Erckelens has shown that of 262 colotomies 151 recovered. I believe that in operations on the large bowel, more especially when performed

[a] Dublin Journal of Medical Science. Vol. LXXXIII. No. 186, p. 511. June, 1887.

[b] Transactions of the Academy of Medicine in Ireland. Vol. II., p. 229. 1884.

while severe inflammation exists at the seat of stricture, complete section of the gut should not be made at first, because thereby the peritoneum is necessarily much implicated at a time when the bowel is not only inflamed but often ulcerated, and frequently the receptacle of accumulated filth. Under such circumstances septic peritonitis is not to be wondered at, and accounts for the much higher mortality attending resection than colotomy.

Section D.—Of 49 resections for artificial anus 19 died, 2 failed. Death resulted from septic peritonitis in 6; simple peritonitis in 4; collapse, 4; obstruction, 3; pulmonary embolism, 2. Of the deaths from septic peritonitis 4 resulted from yielding of the sutures at the mesenteric border; 1 from yielding of sutures due to gangrene at wound-border; 1 from an injudicious separation of mesentery beyond the line of section of the bowel. One of the cases of peritonitis had symptoms of that trouble before operation; in 2 the operations were protracted, and much handling of the intestines occurred; in the fourth case no cause could be assigned for the fatal attack. Two of the cases of collapse were quite unfit for the operation, while of those which succumbed to intestinal obstruction the result was uninfluenced by the operation in 2 instances. The mortality following the operation for anus preternaturalis will diminish greatly when cases are selected, the patients properly prepared for the operation, and the minute details of that procedure accurately carried out.

The above list is very encouraging, especially as it includes a number of cases quite beyond the reach of treatment by Dupuytren's or other methods. At least two-thirds of the cases recorded have recovered. Now this state of affairs, when compared with that shown in Section A., is a startling proof of the folly of subjecting patients suffering from gangrenous strangulated hernia to a lengthened operation.

When we collect and review the cases of enterorrhaphy for perforating wounds of the abdomen implicating the intestine and necessitating this procedure, we find that this department of surgery is keeping pace with the rapid advance which is now being made in the operative treatment of intraperitoneal disease. Few

cases of intestinal suture for perforating wounds are on record. Forty would more than cover all the recorded cases, and after eliminating doubtful ones there are 34 authenticated instances of this operation; and of these by far the greater number have been carried out during the past *three* years—8 in 1885, with 4 recoveries; 14 in 1886, with 3 recoveries; and up to this date in 1887, 7 cases, with 1 recovery. Of the remaining cases operated on, 3 recovered—1 in 1836, 1 in 1848, and a third in 1884. That gives a success of almost 1 in 3, and this, when compared with the results of the pre-Listerian age, is most encouraging. It must be remembered that many of the recorded cases were conducted under difficulties, and most of them, when undertaken, were unpromising. I have no doubt but that a more perfect knowledge of the application of the intestinal suture, and a better acquaintance with the circumstances under which the operation should be attempted, will reduce very much the mortality attending severe abdominal injuries.

Of enterorrhaphy for rupture of the intestine occurring without perforation of the abdominal wall, we know little. As yet only 8 instances of laparotomy and suture for such injury are recorded. Of these 2 died within two hours; 2 in six hours; 1 in twenty-six hours. In the sixth, the time of death is not stated, while the other 2 recovered from the operation. Of the cases of recovery above mentioned, one was an example of the first stage of treatment of such injuries—that is, laparotomy and the formation of an artificial anus; the patient did well, and in four weeks afterwards resection was performed; but the patient died in twenty-six hours;[a] death in this case seemed to result from exhaustion due to the prolonged operation. The state of things revealed by the *post mortem* resembled the condition found after death in a case of mine, in which the operation of pylorectomy lasted two and a half hours. Where, as in Mr. Croft's case, exhaustion is present, the operation, if lasting more than one hour and a half, can hardly be successful. Such at all events is the experience derived from a study of resection of the pylorus. The second instance of what may be

[a] Croft, Brit. Med. Jour., I., p. 975.

claimed as a recovery is the one recorded by M. Bouilly.[a] A man, aged twenty-nine years, was kicked in the abdomen by a horse, on the 11th of June, 1883. He came immediately under M. Bouilly's care, and on the 12th, symptoms of intestinal rupture arising, laparotomy was performed. Five inches of the small intestine were resected, and Lembert's suture was applied—silk No. 0, being used; a large drainage tube was passed into the pelvis, and the abdominal wound was sutured with silver wire. On the third day an evacuation of the bowels occurred, but some fæces also passed through the wound in the abdomen, and from this date a fistula discharging a considerable amount remained. On the tenth day after operation, M. Bouilly made a digital examination of the bowel above and below the fistula, in order to determine what steps would be necessary to restore the continuity of the bowel wall and the existence or absence of an eperon. In three hours after exploration severe shivering set in, then swelling of the abdomen and great pain, the temperature rising to 39° C. In twenty-four hours the patient died with symptoms of septic peritonitis, and the *post mortem* revealed a breaking down of adhesions which had joined the intestine to the abdominal wall.

In bringing this case before the Surgical Society of Paris, M. Bouilly very frankly admitted that the injury done during examination of the fistula caused death. In its absence the case would have recovered; and even as it is, it must be looked upon as a recovery from the operation, and, as such, must serve as a landmark in future efforts in a path hitherto apparently closed to surgical advance.

The above brief account of the operations performed up to this may appear discouraging; but when we remember, as is well said by Curtis, "that even a suppositious case of recovery after the accident is so rare as to be a surgical curiosity," we may congratulate ourselves on the recent advance in our art which enables us to save two in eight, when, as mentioned by Chavasse in his admirable paper, the expectant treatment at best did not offer a hope to more than two in fifty.

[a] Bulletin et Mém. de la Société de Chirurgie. 1883. P. 690.

In reference to the question of abdominal exploration for injured intestine, the conclusions arrived at by M. Bouilly are—1st. That examination of the abdomen for ruptured bowel is an authorised operation. 2nd. The minute dressing of a peritoneum, the subject of an inflammation resulting from stercoral discharge, may stop that trouble. 3rd. The greatest danger after resection and suture is the yielding of the sutures. 4th. All efforts should tend towards perfection in the suturing. 5th. Sutured portion should be left near abdominal wound. 6th. Patient should be nourished with extreme care. 7th. We may hope that experience of cases and perfection of methods will give complete success in traumatic cases when treated early. Vernueil, Després, and others, believe that an artificial anus should be formed, and later enterorrhaphy carried out. The second step should not be undertaken until after the lapse of at least a month, as the bowel will not sooner have returned to its normal state, and adhesions will be imperfect.

The foregoing pages fairly represent the work done in intestinal resection and suture up to this, and as much of the success of the operation depends on the carrying out of the details of the procedure properly, a brief review of the methods adopted by different operators may prove of use. The steps of the operation are—(*a*) abdominal incision, (*b*) clearing out of intestine, (*c*) section of bowel and mesentery, (*d*) intestinal suture, (*e*) cleansing of the peritoneum, and (*f*) closure of abdominal wound.

The incision which seems most advantageous is a central one below the umbilicus, or, if the cause of operation exists in the upper abdomen, one extending round umbilicus and upwards to ensiform cartilage. The advantage claimed for this incision is the readiness with which you can reach and deal with the mesentery. When the cause for operation is in either iliac fossa, as happened in my case, an oblique incision over the seat of disease affords easy access to the bowel and its mesentery. As most of the enterectomies performed up to this have been conducted for disease of the small intestine, the majority of operators have used the central incision below the umbilicus.

The clearing out of the intestine may seem a minor point in this

complicated operation; but when we read of suture of intestine and its return into the abdomen loaded with fæcal matters, we are not astonished to find the patient die from peritonitis, the result of fæcal extravasation—and such is the history of many cases referred to in the foregoing pages. We are all anxious to prevent the escape of the intestinal contents during the operation, when the danger of their so doing is easily provided against, and when the occurrence could be remedied by a thorough cleansing of the peritoneum; but, by leaving the bowel loaded, we expose the sutured surfaces to a strain which they frequently prove too delicate to bear, when peristalsis occurs as reaction is setting in, and thus render rupture likely when the intestine is not within our reach. If free purgation has been brought about previous to operation, and if for thirty-six hours the patient has had nothing by the mouth but a limited supply of liquid diet, the intestinal contents do not give much trouble; but when the operation is conducted for acute obstruction, injury, or a close stricture, one meets with above the point of resection a considerable amount of fæcal matter, which should, if possible, be removed before completing the section of the bowel. To prevent the escaping material contaminating the peritoneum, Madelung[a] advises the passage of a strong suture through the lips of the abdominal incision, in order to bring them together after drawing out the loop of intestine to be operated on. Carbolised protective is then to be laid round the protruding loop, which may now be opened and freed of its contents, the upper portion of the tube being washed out with a warm carbolic solution, 1–200. In acute obstruction, Rehn[b] recommends washing out the stomach before and during the operation. This he believes to be very effective if the distended intestines are not readily manipulated when exploring the abdominal cavity for the seat of obstruction.

In reference to the important question of closing the lumen of the intestine during section and suture, I fully agree with Sir W.

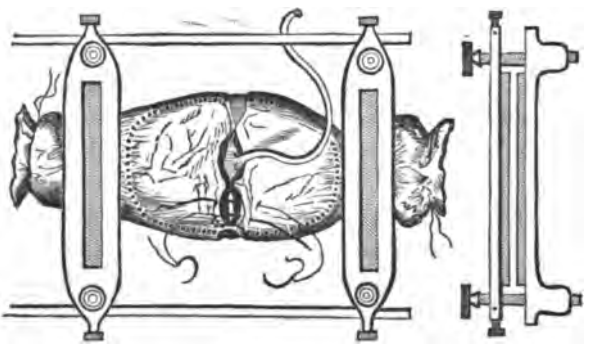
[a] Arch. für klin. Chir. XXVII., p. 277. Ueber circuläre Darmnaht und Darmresection.

[b] Centralblatt für Chir. XXX., p. 87.

MacCormac,[a] when he says—"The fingers are probably the best form of instrument to prevent the escape of the intestinal contents after division of the tube." Parkes[b] is even more definite on the point. He says—"The fingers of a reliable assistant constitute by far the best clamp in resecting the intestine." However, besides digital compression the intestinal tube may be occluded by (1) a loop of silk, (2) a piece of elastic tube drawn round gut, (3) improvised clamps as blades of forceps, covered with rubber tubing, (4) the elastic compresses of Rydygier, (5) clamp forceps, Makins, (6) Treves' clamp, (7) Bishop's clamp, &c.

Loops of silk, rubber tubing, and Rydygier's compresses, are objectionable for two reasons. First, they necessitate a perforation of the mesentery at their point of application. Second, you cannot regulate the amount of pressure used in closing tube, and injury to its walls may result.

Fig. 4.



Treves' clamp (Fig. 4) also requires the mesentery to be perforated, and I think it would impede the suturing at the point where the mesentery joins the bowel; and this is undoubtedly the situation in which the greatest care is necessary in approximating the serous layers.

The principle of Bishop's clamp (Fig. 5) seems better, but the appliance is cumbersome, and would be difficult of application

[a] Oration on Abdominal Section before Med. Soc., London, May 2nd, 1887.
[b] Annals of Surgery, Nov., 1887.

unless the parts to be operated on could on all occasions be brought out through the abdominal incision.

Fig. 5.

Fig. 6 A.

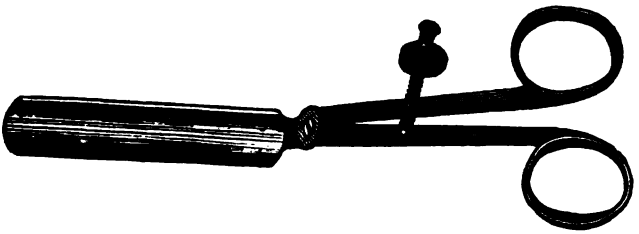
The "provisional" clamp forceps of Makins (Fig. 6 A) seems to me the most convenient. They are light, the pressure easily regulated by the screw, and they can be used in resection of all parts of the intestinal canal. Ivory clamps, as depicted by Bernays, in the *St. Louis Medical Brief*, 1887, p. 310, Vol. XV., are more convenient than those of Treves, but they also require in their application an undesirable interference with the mesentery. For colectomy and colotomy, in both of which clamps are more useful than in

Fig. 6 B.

operations on the small instestine, the forceps (Fig. 6 B, also taken from Bernay's paper) will prove of use: but a more useful and yet simple clamp is the one (Fig. 7) represented in Mr. Ball's work

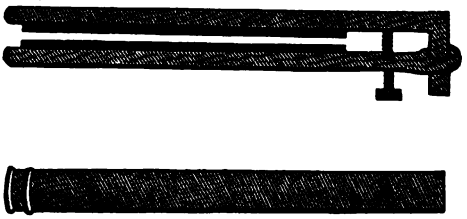
on the rectum. The blades of this instrument run parallel to each other, so that at no point is compression immoderate. An

Fig. 7.



instrument such as I have had constructed, with thin blades, and without long handles (as Fig. 8), answers admirably for enterectomy.

Fig. 8.



There is, however, a growing tendency to the relinquishing of all appliances which in any way inpede the laying on of the sutures, and as most of the clamps in use interfere with the procedure at some part of the operation, surgeons are relying on digital compression as the form least liable to injure the intestinal wall, interfere with the mesentery, or retard the suturing of the bowel.

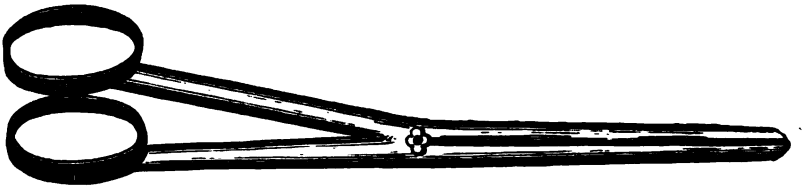
I have found digital compression, even in deep-seated resections, quite effective, and far exceeding any clamp in usefulness (when carried out by one knowing the requirements of such a procedure).

Section of the bowel is usually made at right angles to its course. Berger[a] asks would not oblique section be better than vertical? It might, as he suggests, prevent the strain on one spot, or it might prove useful when bringing together portions of the intes-

[a] Bulletin et Mémoires Soc. de Chir., Paris. 1883.

tinal tract in which sections of the tube differ in size, but it will increase the number of sutures required, and this is a serious objection. As in pylorus resection scissors divide the bowel best, I have had those figured in the accompanying woodcut (Fig. 9) made for the purpose. They are sufficiently long in the blades to divide any part of the intestine in a single sweep.

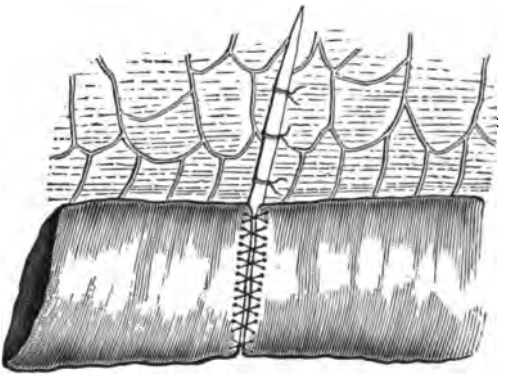
Fig. 9.



There is a point of great importance in reference to section of the gut, and that is the necessity of avoiding all paring away of the mucous membrane, which usually projects beyond the other coats after section is complete. In all the cases in which the projecting membrane was removed the sutures ulcerated through.

The methods of dealing with the mesentery are—First, the removal of a triangular piece with its base towards the intestine,

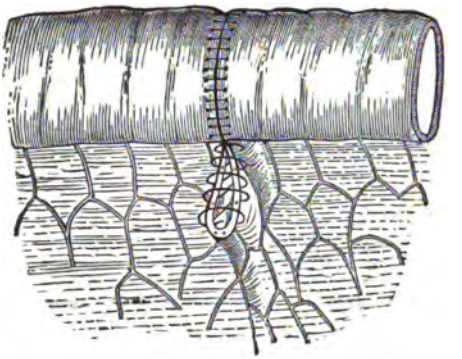
Fig. 10.



and the subsequent suture of the cleft, as in Fig. 10. Second, the leaving behind, as described by Parkes, of the serous and muscular

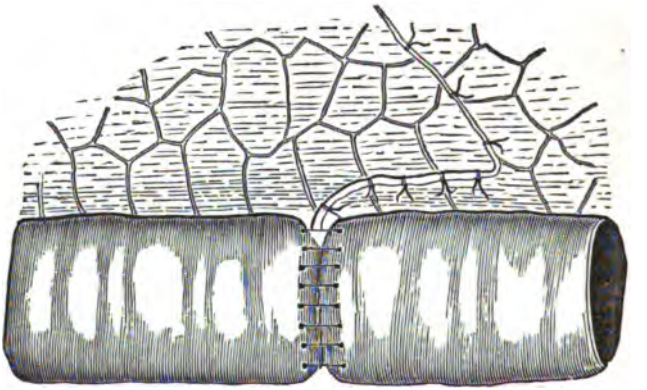
portion of bowel where the mesentery adheres, and subsequent formation of this part into a loop, as in Fig. 11. Third, the

Fig. 11.



folding down of the redundant portion of the mesentery, as in Fig. 12, and suture of it to the neighbouring piece of mesentery.

Fig. 12.

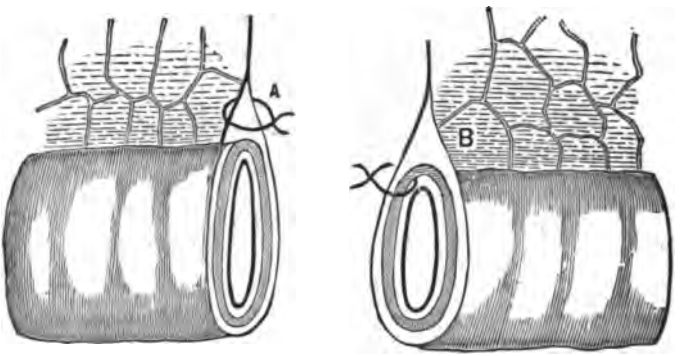


The question of dealing properly with the mesentery is of the greatest importance, for, as first pointed out by Madelung,[a] any interference with the blood supply at the mesenteric edge of the bowel leads to gangrene at the line of suture and fæcal extravasa-

[a] Langenbeck's Arch., Nov. 27, 306.

tion. Madelung's method of dealing with the mesentery after removal of the triangular piece is as follows:—He brings the borders of the mesentery together with suture (Fig. 10); then, as in Fig. 13, A, he sutures the layers of mesentery to each other;

Fig. 13.



then, as in Fig. 13, B, he unites the serous to the muscular layer of the bowel by one suture on each side of the attachment of the mesentery. He always begins suture of the intestine itself at the mesentery.

Curtis[a] details a method of folding down the mesentery on the side of the bowel with a Lembert suture, which, when (as in

Fig. 14 A.

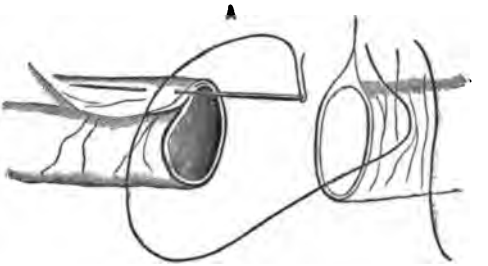
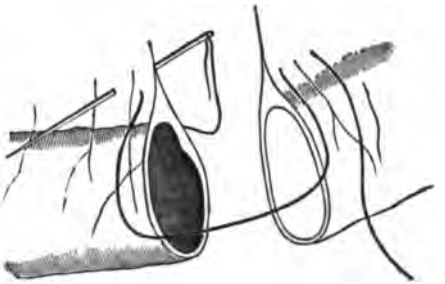


Fig. 14 A) drawn upon, brings the parts together (as Fig. 14 B). This, as Curtis says, disposes of the thickest parts of the mesentery.

[a] Internat. Jour. Med. Sc., Oct., 1887, p. 325.

On each side of this suture, and close to it, a Lembert suture is applied. The one passing through where the mesentery is folded

Fig. 14 B.



down should go deep enough to engage the muscular wall of the bowel. In removing the mesentery it must be remembered that every segment of the intestine, no matter how small, when detached from the mesentery, sloughs away, and septic or perforative peritonitis results. If carefully carried out, the method dealing with the mesentery recommended by Madelung should prove effective. It has done so with me on two occasions.

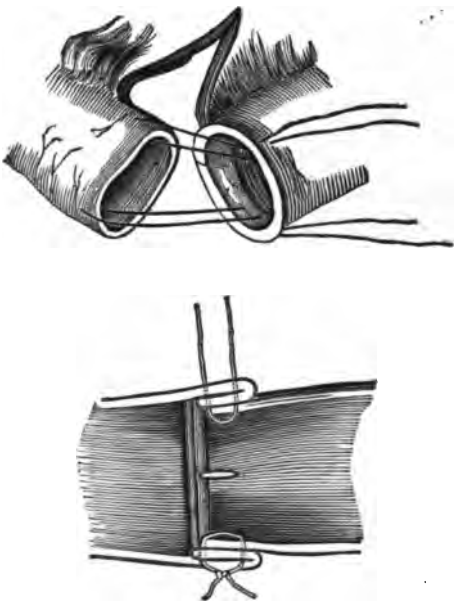
We next come to the question of intestinal sutures, and before alluding to the methods of applying the sutures, it may be well to speak of the materials used. Rydygier and others use catgut, but Billroth, Czerny, Madelung, and indeed most operators, now use silk, and that of the finest quality, usually No. 0 Chinese twist. The objections to catgut are—1st. Its liability to yield too soon; 2nd. The finest catgut requires a much larger needle than does No. 0 silk; 3rd. It is not as pliable or as easily manipulated as the silk. There is really no valid objection to the use of silk, and although I have had good results with catgut, I believe that in the case quoted in this paper yielding of one or more of the catgut sutures led to the formation of a temporary fistula.

There is one condition which we must be prepared for in dealing with inflamed gut, and that is the softened state of the serous coat which allows the fine silk to cut through. Now, when this condition is present, as in cases of perforating ulcer, a soft catgut will

be found more useful, and when knotted carefully it will remain *in situ* quite long enough to allow union of the serous surfaces to take place.

In dealing with the varieties of suture I will not attempt to give a detailed account of all those described; but the important methods of suture require a word of comment. The plan of drawing the cut ends of the intestine over the ferules, as mentioned by Denans, or using instead pieces of dried intestine, trachea, or tubular pieces of wood, has few supporters now. There are on record cases of recovery after this method, and if accurately-fitting cylinders of gelatine, or wax with a sufficiently large lumen are used, they should have a protective influence on the line of suture; as a rule, however, the first peristaltic wave displaces them, and they act injuriously.

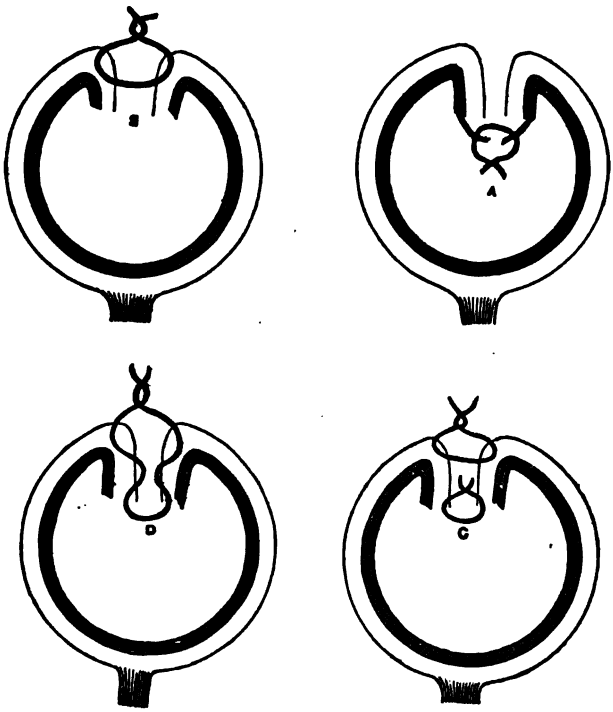
Fig. 15.



The method of invagination (Ramdohr, 1727) adopted and improved by Jobert (Costelloe's Ency., 1822), (Fig. 15) has, like most

of the methods, been occasionally successful. The delay occasioned by inverting the edges of the receiving part, and in drawing one part of the tube into the other, is a grave objection to its adoption, and the necessary separation of the mesentery from the invaginated portion exposes it to gangrene, as shown by Madelung's experiments.

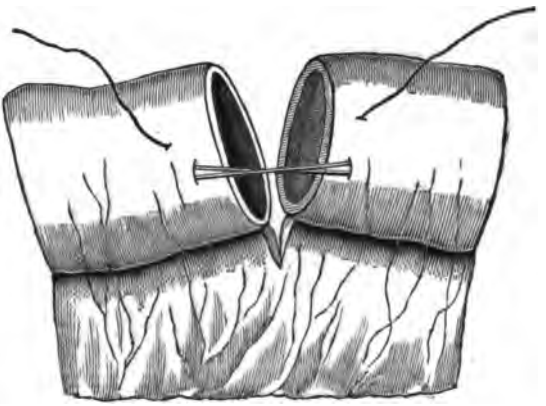
Fig. 16.



The mucous stitch of Czerny (Fig. 16, A) or the serous one of Lembert (Fig. 16, B) will prove unsatisfactory; but the combination known as Czerny-Lembert Suture (Fig. 16, C) is the one now most in favour, and but for the delay occasioned by its application might be looked upon as perfect. Gussenbaur's suture (Fig. 16, D) is said to be very effective; but the deep and superficial coaptation of the serous surfaces occurs on the same line, while in the previous

method the deep and superficial sutures alternate. Gély's suture (Fig. 17), like all continuous ones, is objectionable on the following

Fig. 17.

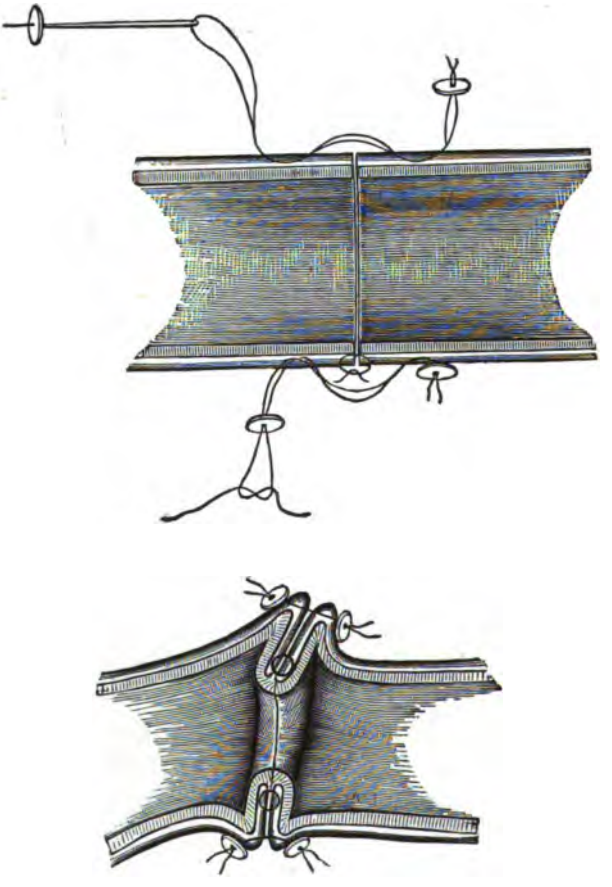


grounds:—1st. It occasionally produces puckering of the bowel wall. 2nd. If drawn sufficiently tight it tends to cut off the blood supply to the wound border. 3rd. If the suture yields at one spot the entire line of suture becomes unsafe. And, 4th. In the disappearance of the sutures, the continuous one with difficulty escapes into the intestinal canal. Bell, Gross, Parker, and others recommend interrupted sutures passed through the entire thickness of the bowel, entering one-twelfth of an inch from the serous border and drawn moderately tight. The objections to this method are that each suture is a new punctured wound connecting the serous coat with the cavity of the intestine; the cutting through of the mucous coat by the sutures destroys what in most of the other methods is looked upon as a protective to the wound border—viz., the redundant mucous membrane.

The continuous serous suture of Dupuytren, and the suture somewhat similar described by Appolito, are not so objectionable as the ones which engage all the coats of the bowel. They are not, however, as reliable as the double row. The rapidity with which they can be applied is greatly in their favour.

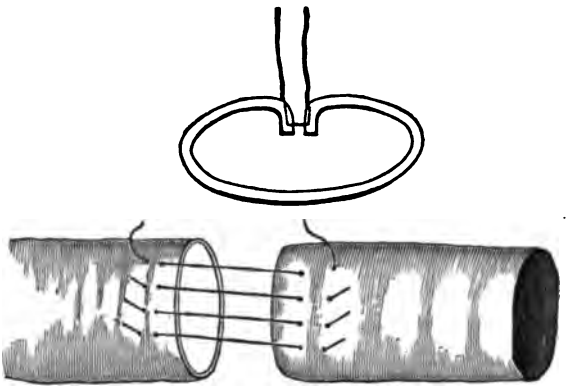
Madelung's method (Fig. 18) is theoretically the most perfect. It is a Czerny-Lembert suture, the superficial threads being passed through small plates of cartilage, which, being approximated and

Fig. 18.



the threads knotted, keep up apposition of the serous surfaces over fairly large areas, thus requiring fewer points of suture than the other methods. The method of applying Lembert's suture is shown in Fig. 19.

Fig. 19.



The needles used for intestinal suture should be the finest that will carry a No. 0 thread. The half curved needles made for me by Messrs. Fannin, Grafton-street, suit admirably. They are easily manipulated; the ordinary needle-holders grasp them in any position, and No. 0 silk exactly fills their track when used double, as it may be with advantage.

With increasing dexterity in carrying out each step of the operation, the suturing after Czerny-Lembert's method should be performed with sufficient speed to interfere but little with the length of the operation. This point once reached, I think we may depend on the double serous suture, or on Madelung's modification thereof.

We now come to the question of cleansing the abdomen. If the loop of intestine has been drawn out through the wound, and the operation completed outside the abdomen, a sponging of the parts near the wound with warm carbolic solution, 1-100, will suffice; but if in the operation an examination of the abdominal contents has taken place, or extravasation has occurred, or should the intestine removed be gangrenous, it is advisable to wash out the peritoneal cavity with carbolic solution 1-200, at a temperature of 99° F. This has the effect of producing an early and desirable reaction, for, in most cases, after the prolonged operation there is great collapse. Solutions of boracic or salicylic acid do equally

well, as also water which has been boiled and allowed to cool down to the proper temperature. When the peritoneum is thoroughly cleansed the sutured intestine is placed close to the abdominal wound. Schede recommends its retention outside the abdomen, but this is an unnecessary and very dangerous exposure. Bouilly leaves the intestine close to the incision, while others apply the loop by a few sutures to the peritoneum at the lips of the wound. The retention outside the abdomen unnecessarily exposes parts which require the warmth and moisture of the abdomen for their restoration, while any fixing of the intestine would tend to a tearing through of the sutures during peristalsis. Leaving the loop free in the abdomen, suturing the abdominal wound with silver wire or strong silk, and passing a fairly large drain into the most dependent part of the wound, seem the most successful way of completing the operation.

While leaving unsaid very much that is important in reference to this operation, I cannot conclude without expressing my gratitude to the Council and Members of this Section for their kind indulgence in allowing me so much of valuable time to bring this question under their notice.

SECTION OF OBSTETRICS.

PUDENDAL HÆMATOCELE.

By RICHARD D. PUREFOY, M.D., F.R.C.S.;
Obstetric Surgeon, Adelaide Hospital.

[Read in the Section of Obstetrics, November 25, 1887.]

HÆMORRHAGES into the tissues of the external genital organs are most frequently situated in the labia majora, less frequently in the labia minora, or in the perinæum alone. The blood is generally extravasated into the subcutaneous cellular tissue; in the vagina into the submucous tissue or the cellular tissue encompassing it; in the perinæum between the superficial and median fasciæ. As a rule, the effusion is below the diaphragm of the pelvis; yet there are cases in which it has extended along the vagina up to the periuterine cellular tissue, and posterior to the peritonæum up to the kidneys, and anteriorly as far as the navel. The division into supra- and infra-fascial is convenient and commonly accepted. The tumour varies in size from a hen's egg to a child's head, usually due to the laceration of a vessel, either artery or vein, in the vagina or vulva. The occurrence is attended by excruciating pain, steadily increasing with the formation of the tumour, along with severe straining and pressing, which are often taken for after-pains. As the distension augments the vulva may yield to the pressure and burst, discharging blood and clots; the patient may even bleed to death by this external hæmorrhage. More frequently the consequences are profound shock, evidenced by pallor, restlessness, syncope, and nausea. If the tumour be small it may disappear altogether by absorption, but when it reaches a large size rupture commonly occurs on its inner aspect, either at the time of its

formation or during the three following days. Even after this secondary hæmorrhage may ensue, and the cavity be filled anew. The various terminations mentioned by Winckel are—1. Death by bleeding, with or without rupture. 2. Death by pyæmia, commonly after rupture. 3. Rupture, followed by recovery. 4. Rupture and subsequent fistula. 5. Absorption without rupture, ending in recovery.

In these cases the diagnosis is seldom, if ever, difficult. During or shortly after labour, severe pelvic pain is experienced, followed by the formation of a swelling, generally visible externally, attended by grave constitutional disturbance, as noticed above; the bluish colour and elastic feeling of the tumour amply demonstrate an effusion of blood into the parenchyma.

In a series of 50 cases, 16 occurred during labour, 15 immediately after delivery, and 4 during the first 3 days of childbed. If a vessel is directly torn or burst, the effusion begins at once; if only a sloughing of the wall of the vessel has been produced by pressure during labour, the extravasation does not occur till this spot has fallen away. Recent observations have shown that the accident does not occur more frequently in primiparæ, or in women who have varicose veins in the vulva or labia. Judging by the statistics of the St. Petersburg and Vienna hospitals, we may conclude that these effusions occur about once in 1,600 labours.

Our prognosis must be guarded, but is more favourable now than formerly. If the evacuation take place early, without extensive gangrene of the soft parts or a fresh hæmorrhage, the prognosis is, on the whole, good; if the gangrene is considerable, and loss of blood profuse, 12 per cent. die, and the remainder have a protracted convalescence. The prognosis, after all, is less favourable in cases of extensive sub-peritoneal extravasations of blood during childbed than in the equally large effusion into the peritoneal cavity of non-puerperal women.

In considering the treatment we must distinguish between the cases occurring *during* and *after* labour. In the first class, if the tumour be of moderate size, not obstructing the progress of the delivery, it is better to abstain from active interference; if its size

be such as to prevent the passage of the child, it may become necessary to lay it open and plug the cavity with a suitable styptic, using subsequent measures to expedite delivery; in doing so we are fully justified in lessening the size of the head if we have satisfactory evidence that the fœtal heart has ceased to beat. When the accident occurs after labour, the treatment consists in the early recourse to measures to prevent the extension of the thrombus. The vagina may be plugged with cotton wool or a colpeurynter filled with ice water: if the tumour be in the labium an ice bag may be laid on it; at the same time we should give opium freely—sometimes with the addition of digitalis. As soon as we can determine that the tumour has ceased to increase it is well to use absorbents alone, such as camomile tea, infusion of arnica, &c., with the addition of liq. plumbi and tr. of opium; at the same time enjoining perfect quiet and the recumbent position, and securing the regular action of the bladder and intestines. Rising and sitting up, and generally nursing, must be interdicted, and opiates used to procure sleep. Under these measures the tumour may rapidly diminish, and the beginning of absorption will be recognised by diminished pain, tension, and volume. If the thrombus does not exceed the fist in size, when the integument of the vulva is not discoloured or too tense, and when perforation is nowhere imminent, incision is not indicated. When, however, the pain and discoloration increase, attended with the formation of vesicles, an incision of suitable size should be made, preferably on the inner side of the greater labium, at the most prominent part; and after evacuation of the clots the cavity should be washed out with some antiseptic solution, and afterwards filled with charpie soaked in the same. A T bandage, with compresses, will hold the dressing in position, and it should be changed twice daily. In the absence of the urgent symptoms mentioned, it will be well to postpone the incision for a few days, and thus greatly diminish the liability to secondary bleeding, which has occurred in several cases where early recourse was had to the operation.

My personal experience of this formidable complication is so far limited to two cases, which I shall briefly narrate. The first case

was that of a primipara, whose labour was completed without any difficulty with the aid of the forceps, rendered advisable by some delay in the second stage. Shortly after delivery she began to suffer from troublesome pelvic pain, referred to the right side of the vagina. When I saw the patient three hours afterwards, a tumour the size of an egg could be felt just inside the vulva on the right side. Beyond the local pain there was nothing in her condition to cause anxiety, and the administration of a little opium was followed by complete relief and a speedy convalescence. Through the kindness of my friend, Dr. Allen, I was recently afforded an opportunity of seeing and treating a much more formidable case of the same nature.

The patient, an unusually strong healthy young woman, was taken ill in her third labour early in the morning, when the liquor amnii escaped. Notwithstanding severe and frequent expulsive pains the second stage was prolonged for several hours, owing to a face presentation mento-anterior. However, shortly after my arrival at the house, satisfactory advance took place, which I aided by pressure over the uterus, and the labour being completed by natural efforts, I left mother and child in a most satisfactory condition. In something more than an hour after delivery violent pains, supposed to be after-pains, were felt, and in about an hour afterwards a large tumour formed externally, so distending the right labium that all trace of the nympha was obliterated, its remains appearing like a cord stretched across the surface of a livid-coloured mass extending from the mons veneris almost to the anus, the integument around which was extensively ecchymosed. In Dr. Allen's unavoidable absence I was hurriedly summoned, but already, at the time of my arrival, a rupture had occurred on the inner aspect of the tumour, and the woman lay in a pool of blood. I confess to feeling no little anxiety about her safety, and some hesitation as to the wisest course of action. I gave a full opiate, and determined to watch the effects of cold and pressure, which for a considerable time I maintained with the hand and napkin wrung out of cold water. The draining from the rupture gradually diminished, and matters improved so much that I seriously thought

of leaving, when, rather suddenly, the worst signs and symptoms of exhaustion from loss of blood were developed—restlessness, laboured breathing, tinnitus aurium, loss of vision, and failure of radial pulse, which for a while became imperceptible. I injected ether, and gave opium and brandy by mouth and rectum, and in a short time our efforts were rewarded by a marked improvement in our patient's condition. At this critical juncture, her husband, with my entire approval, had sought Dr. Kidd's aid; he agreed with me that in the absence of any increase of size or renewed bleeding from the labium, the treatment should not be altered. During the two following days the tumour was covered with lint smeared with resin ointment, mixed with iodoform and balsam of fern. At the same time, irrigation with hot water and Condy's fluid was practised at short intervals, and the urine drawn off—a matter of no small difficulty. On the third day the original opening extended for a space of two inches along the inner aspect of the mass, and allowed the enucleation of a large mass of softening clots, which, however, were only finally and completely detached during the four following days. This process was greatly helped by directing a stream of hot water forcibly from an ear syringe, and extricating very cautiously with the fingers any soft portions which, at the bottom of the cavity, could be felt but not seen. A tedious but satisfactory convalescence has ensued. I think this case emphasises the wisdom of the advice given by Winckel—viz., that early incision should not be practised unless the indications for it are obvious, for it is more likely to be followed by secondary hæmorrhage. It may be added that our patient is singularly free from varicose veins in the legs and labia. It is satisfactory to note that two members of the Dublin School, Dr. Rainy and Dr. M'Bride, were the first in Great Britain to describe this affection, in which they are only preceded by Veslingius, who wrote in 1647.

ON PROOFS OF VIRGINITY.

By R. J. KINKEAD, M.D.;
Professor of Midwifery, Queen's College, Galway.

[Read in the Section of Obstetrics, December 23, 1887.]

Although the chief interest of the cases I have the honour to submit for the consideration of this Section is chiefly medico-legal, yet one of them is worthy of record as being a decidedly successful gynæcological operation.

Great reliance is placed on the presence of a perfect hymen as proof of virginity.

Thus: "Of late years experienced obstetricians, such as Barnes, Oldham, and Tyler Smith, have sworn to the fact of females being *virgines intactæ*, chiefly on the ground of the integrity of the hymen;" and Meymott Tidy, from whose Forensic Medicine the above quotation is taken, "thinks there are good grounds for accepting the following statement of Caspar, with the addition" he "has placed in brackets:—'Not assenting to that unfounded scepticism, which has been asserted in regard to this question, both in earlier and more recent times, I must declare, that when a forensic physician finds (in a girl arrived at puberty) a hymen still preserved, even its edges not being torn (and more particularly if the aperture be undilatable and of small size, and the membrane itself normally placed and of ordinary shape and structure), and along with it (in young persons) a virgin condition of the breasts and external genitals, he is then justified in giving a positive opinion as to the existence of virginity.'"

The last sentence is delicious—if a virgin condition of the external genitals be found, the woman is a virgin. Self-evident; but what is a virgin condition? How many or how few attempts at intercourse will constitute a non-virginal condition? What forms of

local or general disease, debility, or development, will simulate a non-virginal condition?

These are points which, although a good deal may be said on both sides, I have not time now to enter on; or on the question, apart from pregnancy, how to recognise, or what constitutes a virginal condition of the breasts, or how long sexual intercourse must be continued to change their virginal character. That, taking all the usual signs of virginity, the diagnosis is sometimes difficult, the well-known case reported by Brent Duchatel shows. But when dealing with the hymen alone the difficulty is vastly increased. If a woman were a virgin until complete penetration had been effected, in most cases the physical distinction between a virgin and a woman who had lost her virginity would not be difficult; for although cases would be found in which, owing to disproportion, elasticity, relaxation, small size, or excessive development of the hymen, it had not ruptured during intercourse, yet such cases would prove the exception to the general rule.

But I take it that a virgin ceases to legitimately enjoy that title when intercourse, even though it be merely vulval, has taken place; and unless such intercourse be forcible or often repeated, I confess that I know of no physical signs which will testify to the fact. The following cases will show that the hymen, *per se*, may be no evidence at all of a virginal condition. The proviso made by Caspar—"even its edges not being torn"—is a most important one. I think it was Schroeder—but am not sure—who, some years ago, called attention to the fact that the hymen was not destroyed by intercourse—only torn—and that, as a general rule, it was not destroyed until after the first delivery. This fact I have verified myself. The depth to which the hymen is lacerated depends on the size of the male organ, the frequency of intercourse, and the condition of the female genitals, the latter being far more distensible and yielding near a menstrual period. Therefore the only injury done the hymen may be, and often is, after one or two attempts at intercourse, slight lacerations of its edge, but even these may not exist after repeated attempts have taken place, nor in some after complete penetration.

Case I.—Early in 1880, shortly after I had been appointed Medical Officer of Her Majesty's Prison, Galway, I admitted X., a prostitute, about twenty-four or twenty-five years old, to the hospital of the prison. She was suffering from secondary syphilis, also from condylomata, and complained of sores on, and discharge from, the vulva.

Her history was, that being seduced when about seventeen, she had been for some time mistress of her seducer, after which she went to Aldershot, and spent two years there, as a common soldier's prostitute. She returned to Galway and spent her time between the prison and prostitution with soldiers and sailors. She thus accounted for seven years of her life before she came under my care.

On examining her I found that the external genitals were certainly not virginal, but there was no enlargement of the nymphæ, no laceration of the fourchette, and there was a perfect, well-developed unruptured hymen, the edges sharp and perfect without a single tear; the fossa navicularis was depressed, and the orifice of the vagina very deeply seated. The cause of non-penetration seemed to me to be that the arch of the pubes was of the masculine type—angular—and the vulvæ placed more towards the back than usual. Be that as it may, the fact remains that, as far as a perfect hymen, of normal size, consistency, and shape, was concerned, the woman was a virgin after seven years' prostitution.

Moreover, in order to treat a sharp attack of gonorrhœal vaginitis, I had to pass a small-sized Ferguson's speculum, during which operation the hymen tore without any extra force being used.

Case II.—I was consulted for amenorrhœa; various symptoms of uterine disease were described, and the possibility of pregnancy positively denied. On examination the external genitals were found virginal, the hymen perfect, its edges sharp and untorn, its size, shape, position, and consistency normal, the breasts plump and well formed, showing no evidence of pregnancy; the fundus of uterus could be felt over the pubes, and finally the patient confessed that she had once had intercourse—about three and a half months previously, just before a menstrual period was due.

Putting aside the enlargement of uterus, there were no physical signs indicative of the fact.

Case III.—I was sent for a short time ago to see a woman in labour; she was under the care of an experienced midwife, who

told me, on my arrival, that the patient had been some hours in strong labour, that the head was presenting and low down, but that owing to the woman having been operated on for some disease of the uterus (prior to marriage) the os would not dilate. On proceeding to examine, my finger met with an obstacle at the vaginal orifice; the feeling conveyed was distinctly that of the vaginal walls being adherent from the orifice upwards—how far I could not say. On having the patient turned to the light, the cause of the obstruction was at once apparent.

The entire orifice was filled by the hymen, evidently thick and fleshy towards its base of attachment all round, projecting from the orifice in a perfectly semi-spherical shape, and with a central aperture no larger than a crow quill. So small was the opening, that notwithstanding the pressure on the hymen of the liquor amnii, the fluid escaped in drops. The edges of the orifice were thin and white, the remainder of the hymen red.

I had no difficulty in lacerating it with my finger. The torn section was triangular, increasing from a line at the edge of the opening to about one-fourth of an inch at the base. I shortly afterwards delivered her with the forceps without difficulty.

She told me that when a girl she had no changes; she suffered from pains every month; that, finally, a tumour appeared in the abdomen; that she was admitted to St. Vincent's Hospital, and there operated on, after which her changes appeared. She was under the impression that the operation had been performed by Dr. Roe, but this impression was erroneous. As, however, she states that it was about ten years ago, and is positive as to the hospital, her case may be remembered by some of the staff of St. Vincent's Hospital, and it would add much to the interest of the case to know to what extent accumulation of the retained menses had taken place, and whether the uterus had been distended, or merely the vagina. The opening in the hymen then made must have been very much larger than that which existed when I saw her.

Judging by the size of the hymen, intercourse must have been entirely vulvar. The urethral orifice was enlarged enough to admit the tip of the finger, but the dilatation did not extend more than one-fourth of an inch up the urethra.

Many cases of pregnancy following vulvar intercourse are on record, and some where pregnancy is reported to have occurred

with "completely imperforate hymen;" but it is evident that in these cases adhesive inflammation must have set in after impregnation. The case is singular, from its following an operation for retained menses, and from the orifice being completely blocked by a hymen with so minute a central opening.

Case IV.—In this case the curiosity was the size of the hymen, and that I was able to deliver the woman, with the forceps, of a male child, without injuring the hymen.

The woman was over forty years of age, in labour of her first child. The hymen was exceedingly voluminous, springing from the anterior portion of the vaginal orifice, below the urethra, and hanging down, apparently outside the vagina.

I am aware that very many cases are recorded of pregnancy advancing to term with unruptured hymen; but I doubt if the relative frequency of the existence of the hymen after sexual intercourse is generally appreciated. Its presence is merely presumptive proof of purity; its absence, or evidence of its having been torn, is hardly even presumptive proof of want of chastity.

Admitting that a hymen of normal size, shape, and consistence, may be evidence that penetration has not taken place, I doubt that we can say more.

Case V.—A lady called on Mr. ——, who gave the following history of her case:—She had suffered from "displacement of her womb," owing partly to being obliged to stand for a long time every day, and lift weights, and partly the result of a fall. She had been under medical treatment, and finally a support had been put in, after which she felt very well, was able to enjoy life, follow her usual occupation, and take long walks; but being on a tour she had over-walked herself, and the old discomfort came back. She was certain the support must have become displaced, and the falling down of the womb came back.

As the support had been in several months, it probably needed changing. I took out a medium-sized ring pessary, and found the uterus in its proper position, but the patient would not be content without it. Now, the interest of this case, for the purpose of this paper, lies in the fact that, notwithstanding uterine treatment and the introduction of a medium-sized pessary, the vulva was what we

call virginal, and the hymen unruptured, but its edge was not perfect. In the centre of the edge was a small notch—evidence of a slight tear of the margin of the hymen during treatment, either resulting from the passage of a speculum or the introduction of the pessary.

Given such an appearance of the genitals without any history of treatment, or in some medico-legal case in which one would place little reliance on the statement of the subject examined, then judging from the virginal appearance of the vulva, and presence of a normally-sized and situated hymen, a strong opinion might fairly be formed that no foreign body of any considerable size had penetrated the vulva, or taking into account the notch in the edge of the hymen, an equally strong opinion might be maintained that sexual intercourse had occurred. Yet, both conclusions would have been wrong.

CASE OF VAGINAL EXTIRPATION OF THE UTERUS, IN WHICH BOTH URETERS WERE TIED.

By ARTHUR V. MACAN, M.B.;
Master of the Rotunda Lying-in Hospital.

[Read in the Section of Obstetrics, December 23, 1887.]

In the summer of 1886 I was fortunate enough, when visiting Berlin, to see Dr. A. Martin remove a uterus per vaginam for malignant disease. Ever since my return I have been on the look-out for a case that I thought was suitable; but the patient, whose history I shall relate to-night, was only the second on whom I thought the operation should be performed. The first patient, at the time the diagnosis of malignant disease of the fundus was first made, felt so well that she refused to allow the operation, and when she came back nearly two years later the fundus had grown to an enormous size, and the operation was out of the question. Since I operated on this patient on October 12th, three other cases have presented themselves, in two of whom I have operated. The third was, I thought, too anæmic for an operation at present, and her husband removed her from the hospital.

The case I wish to bring before you to-night is shortly as follows:—

Mrs. ——, aged sixty-seven, was sent up to me from Dr. Jennings, of Ennis, for shedding accompanied by a fœtid discharge, which had been going on for eight months; she is forty-seven years married; has had eleven children and one miscarriage. She is twenty-four years past the change of life, and she was in her usual health till eighteen months ago, when she noticed a thick yellow discharge from the vagina. About eight months ago this turned to a new discharge, which had continued almost continuously ever since, but some days is more profuse than others. Has noticed

that the discharge has a very bad smell; does not think she has lost flesh, and she is as active as ever, but has no appetite.

On examining her I found the external genitals moist, and there was a very bad smell. On washing out the vagina a very dirty discharge escaped, in which were a number of small, ash-grey particles like broken-down tissue. No hæmorrhage was caused however by the end of the Bozhman catheter. Still I was astonished on introducing the finger to find the cervix small and healthy. On now passing the Bozhman catheter into the uterus, which was easily done, the same sort of discharge again gushed out, followed by some hæmorrhage. Before withdrawing the Bozhman I turned the fundus, which had been posterior, forwards; and then on making a bimanual examination I found that it was small and freely movable. I therefore made the diagnosis of malignant disease entirely confined to the interior of the uterus, and advised the patient to come into hospital for operation, which she did on Sept. 27th, 1887. On Sept. 29th she was again examined in the surgery, and there was slight hæmorrhage and fœtor when cavity of uterus was washed out. On the day before operation I again washed out the uterus, and plugged the cavity with iodoform gauze.

On Oct. 12th I removed the uterus per vaginam, Drs. Lane and Smith assisting me. I adopted, with only a slight modification, Dr. Martin's method, as I had never seen the operation performed by anyone else. It will, I think, save time and prevent confusion if I first briefly describe Martin's operation, and then mention the difficulties I found in performing it. The vagina having been first thoroughly disinfected, a Fritsch's speculum is then inserted, and the posterior lip of the cervix caught with an American forceps, and drawn forcibly downwards and forwards. An incision is now made round the posterior margin of the cervix, and the posterior vaginal wall separated from the cervix till the peritoneum, which is recognised by its bluish transparent appearance, is reached. The edges of the wound in the vagina are then sewn parallel to the incision, so as to bring the peritoneum and vaginal wall together. In this way all hæmorrhage is arrested. The forefinger of the left hand is then inserted into Douglas' space, and the neck of the uterus being drawn well over to the right side, a ligature of double silk is passed under guidance of the finger in Douglas through the lower part of the left broad ligament, and tied firmly. A second and third are similarly passed and tied, each including a higher portion of the broad ligament. This process is repeated on the

right side in a similar manner. The central fissure is now incised, and the bladder separated from the uterus as far as the peritoneal reflexion from uterus on to bladder. This is done as much as possible with the finger and the handle of the knife. The next step is to free the cervix on each side from the broad ligament as far as they are commanded by the sutures. While doing this each vessel should be tied separately as it is cut through, in order to lessen the chance of secondary hæmorrhage. The forefinger is now again inserted into Douglas' space, and passed over the broad ligament and into the utero-vesical pouch, and the peritoneum in this position divided on the finger. The fundus is now retroflexed—if possible bimanually—and drawn out through the opening in the posterior *cul-de-sac*. This brings the whole of the upper remaining portion of the broad ligament into reach. Round this, under guidance of the finger, a ligature is passed, and the remains of the ligament are tied first *en masse*. A double ligature is now passed through the centre of the pedicle, but nearer to the uterus than the last, and each half is tied separately. The uterus is now freed entirely on this side, all vessels that are seen being ligatured separately, and the same thing is repeated on the remaining attachment of the uterus. When this last is cut through, the uterus is quite free, and can be removed. During all this time the wound in the vagina is kept constantly irrigated by a stream of plain warm water. As soon as the uterus is removed a search is made for any bleeding points, which are sewed, and Douglas' space and the vagina are washed out. Dr. Martin then inserts a large drainage tube into Douglas' space, the end of which he doubles upon the vagina, and the operation is finished.

This was in the main the operation I performed, but I commenced by separating the bladder from the cervix, and the opening into Douglas' space was rendered difficult by my incising the cervix so deeply that it separated entirely from the body of the uterus, under the traction that was used to draw it downwards.

The operation lasted over two hours, but the amount of blood lost was not more than three or four ounces. The patient had borne it very well, and before she was put to bed the catheter was passed, and a small quantity of urine was drawn off. Soon after coming out of the ether the patient began to complain of pain in the lower part of abdomen and back, and in the afternoon Dr. White—in whose charge she was—sent down word that he had passed a catheter, but had not found any urine in the bladder. In

the absence of any cause for an acute and total suppression of urine, I at once came to the conclusion that I had tied both ureters. As it was already quite dark, I had to put off any further operative interference till next morning.

On thinking over what was the best thing to do, several plans occurred to me. First, to pass a catheter into the bladder and then cut the ligatures one by one till urine came from the catheter. The sudden gush of retained urine would probably have enabled me to recognise when the second ureter even was freed; but by this plan I might be cutting ligatures that had not caught the ureters at all, and thereby running a great unnecessary risk of hæmorrhage. I therefore determined to incise the bladder freely in the mesian line, then evert the two edges and try and find the orifices of the ureters, and pass a probe down each till it reached the point of obstruction, and then cut the ligature that seemed to be nearest to this point. This I did, but the orifice of the ureters was hard to find, as the small jets of urine by which their locality is generally recognised, were of course wanting. Any one who has tried to find them in a bladder removed after death will fully appreciate this difficulty. At last, while everting the mucous membrane, I caught sight, for a moment, of a small dark speck, about the size of the head of a small pin. This I lost and found again several times before I was able to demonstrate that it was the orifice of the ureter, by passing a probe down it to the point of obstruction. I then examined to see which ligature seemed nearest to the probe, and cut it, watching anxiously for the hæmorrhage, which I felt certain must come, and which I hoped to control with large compression forceps. No hæmorrhage, however, followed, nor was the ureter freed till two ligatures were cut on one side, and two or three (I am not now certain which) on the other. I have seldom experienced such a sense of relief as when the second gush of urine came from the second ureter, and I felt my object was accomplished, without any serious hæmorrhage. The absence of the latter I think was due to the great care I had taken to tie all vessels seen in the face of the bound ligament stump, separately. I then brought the wound in the bladder together with six silk sutures.

Though the ureters were now quite free, I was well aware that the prognosis must be a guarded one, till time showed whether the ureters were or were not permanently injured by being included in a tight ligature for twenty-four hours. The patient too, though

greatly relieved after the operation, was never quite well, and about ten days after the nurse reported that urine was coming away freely per vaginam. As, however, the patient was able to pass water per urethram, it was tolerably certain that there was no want of union in the wound in the bladder, and therefore that one of the ureters had opened into the vagina. This was made a certainty by finding that milk injected into the bladder did not escape per vaginam. After about a week the quantity of urine escaping per vaginam diminished partly, and from the pain complained of in the right groin, and right iliac and lumbar regions, it seemed probable that the right ureter was again becoming occluded. This supposition became a certainty some few days later, when a large, tender elastic tumour was palpated in the right lumbar region. After a time there was again an escape of urine from the vagina, owing, we thought, to the tension in the ureter having overcome the occlusion. The tumour in the lumbar region at the same time became evidently smaller, and the tenderness less.

On November 29th the patient was attacked with conjunctivitis, which was followed in a couple of days by the formation of a large ulcer on her cornea. She was seen on December 4th by my friend, Dr. Maxwell, who opened the anterior chamber. Two days afterwards she had an attack of acute pneumonia accompanied by sudden and intense pain in the eye, of which Dr. Maxwell was unfortunately not given notice, and when he saw her afterwards the eye was practically lost, nor would the patient then allow anything to be done to relieve the pain. The inflammation of the eye gradually subsided, and the patient went home to Somerville on December 20th. When she left hospital there was still a slight escape of water per vaginam; but the nurse has heard since that this has quite ceased, and that she bore the journey well. She had, however, never recovered her strength, and I fear that there must be some amount of stricture of the left ureter, causing the urine to be secreted under increased pressure, though this has not been enough to distend the left kidney sufficiently to be palpated. Indeed it seems to me that the right kidney is now giving her very little trouble; and that, if the left were secreting freely, she would soon gain strength completely. Such is the clinical history of this case, and I wish sincerely I could stop here. But the worst mistake of all has yet to be confessed—namely, that, though the history of the case and the physical examination of the patient seemed to point indubitably to malignant disease, the microscopic

examination of the uterus, kindly made for me by Professor Purser, shows that nothing of the sort is present. There is great thickening and hypertrophy of the mucous membrane, but no carcinoma.

In looking back on the case I can quite see that it was overconfidence in my first diagnosis that led to the mistake. But I confess I had never seen or heard of a similar case, though the uterus has several times been removed by well-known operators, under the false supposition that it was cancerous. This case will, I think, at all events prove that the recurrence and persistence of a red discharge twenty-four years after the change of life, accompanied by a fœtid discharge containing particles of what looked like broken-down cancerous tissue, is not sufficient to justify the diagnosis of malignant disease of the uterus.

REMOVAL OF AN ENLARGED FIBROID UTERUS.

By W. K. M'MORDIE, M.D.;
Surgeon to the Samaritan Hospital for Women, Belfast.

[Read in the Section of Obstetrics, February 10, 1888.]

S. C., aged thirty, single, a mill-worker, was admitted to the Samaritan Hospital for Women, Belfast, on January 26th of the present year. For two years previously she had suffered almost continuously from hæmorrhage, and for the past five months she was so feeble that she was unable to attend to her work. The uterus felt irregularly enlarged to about the size of a sixth month's pregnancy. The sound passed 4½ inches, but I think the cavity was larger than this, but owing to the narrow irregular outline the sound did not get the full length. In her present state the woman could not earn her living, and she had no means of support except her daily work.

She was most anxious to have the tumour removed. I explained to her fully the risks of the operation, and she expressed herself as willing to take the risk, upon my stating that in case of recovery she would be able to return to her work.

Laparotomy, January 29th.—I made an incision in the median line about four inches long. Having satisfied myself as to the nature and size of the tumour, I prolonged the incision upwards to the upper border of the umbilicus, and downwards towards the symphysis pubis. The incision now measured seven inches. I was now able to draw out the uterus, with both ovaries. The ovaries were enlarged and soft, and I ligatured both separately. I now passed a wire round the base of the tumour and tightened the screw. I then cut away the portion of the tumour now shown. The base of the tumour was so broad that when I tried to pass the

pin I was provided with immediately above the wire, I found it was too short. I was afraid to trust to the wire without the security of the pin, so I applied the powerful clamp used by Dr. Keith immediately above the wire, which I removed. I now sliced away the stump as close to the clamp as I thought safe. In this way I removed 2 lbs. The portion I now show weighs 4½ lbs., so that the entire tumour removed weighed 6½ lbs. When applying both the wire and clamp I was careful to keep the bladder and ureters clear. I fixed the stump in the lower angle of the wound and carefully applied round it the peritoneal surface of the abdominal wall. The upper part of the wound was brought together by silver wire, the lowest suture being quite close to the stump. I did not pass it, as is sometimes recommended, through the stump below the clamp. I did not sponge out the peritoneal cavity, as I was quite certain no blood escaped into it during the operation. I made no provision for drainage. Salicylic wool was packed round the stump, and below the handles and point of the clamp. I dusted the stump with iodoform powder and covered the entire abdomen with salicylic wool and a flannel besides.

The patient made most satisfactory progress. The temperature never rose above 100°, and the pulse 105. On the fifth day portions of the sloughing stump were removed. On the seventh day the clamp came away and the sutures were removed, the upper part of the wound having healed by primary adhesion. To-day—14th day—the temperature and pulse are normal, and the wound is healthy and healing rapidly.

REPORT OF GYNÆCOLOGICAL DEPARTMENT OF THE ROTUNDA LYING-IN HOSPITAL, FOR THE YEAR ENDING NOVEMBER 3, 1887.

By ALFRED J. SMITH, M.B., M.Ch., M.A.O., R.U.I.;
Assistant-Physician to the Rotunda Lying-in Hospital, Dublin.

[Read in the Section of Obstetrics, February 10, 1888.]

In submitting the Report of the Gynæcological Department of the Rotunda Hospital for the year ending November 3rd, 1887, I wish to return my sincere thanks to Dr. Macan, the present Master of the Hospital, for the privilege of so doing.

Gynæcological Wards.—The gynæcological wards contain 30 beds; 450 patients were received during the year, being an increase of 106 over the previous twelve months. I have divided the various diseases into three classes—extra-uterine, uterine, and miscellaneous, and I have tabulated under each head, the diagnosis with result, showing the mortality percentage.

Table I.—*Extra-uterine Diseases.*

Diagnosis	No.	Cured	Relieved	Died
Hæmatoceles	9	9	—	—
Extra-uterine Fœtation	2	1	—	1
Para-perimetritis	24	22	—	2
Parametritis Posterior	10	—	10	—
Ovarian Tumour	11	7	3*	1
Abscess of Ovary	1	1	—	—
Hydrosalpinx	1	—	—	1
Total	58	40	13	5
Mortality	—	—	—	8·6 %

* Left Hospital before operation.

TABLE II.—*Uterine Diseases.*

Diagnosis	No.	Cured	Relieved	Died
Retroflexions	48	40	8	—
Retroversions	39	36	3	—
Prolapse	6	2	4	—
Inversion	1	1	—	—
Hyperinvolution	1	—	1	—
Endometritis Catarrhalis	57	51	6	—
Fungus Endometritis	4	4	—	—
Endocervicitis with Erosion	34	34	—	—
Fibroid Tumours	8	—	7	1
Fibrous Polypi	8	7	1	—
Sarcoma Uteri	2	—	2	—
Carcinoma Uteri	30	—	30	—
Dysmenorrhœa	8	6	2	—
Stenosis of Internal Os Uteri	1	1	—	—
Extensive Laceration of Cervix	1	1	—	—
Total	248	183	64	1
Mortality	—	—	—	·4 %

TABLE III.—*Miscellaneous Diseases.*

Diagnosis	No.	Cured	Relieved	Died
Incomplete Abortion	18	18	—	—
Missed Abortion	1	1	—	—
Vesico-Vaginal Fistula	3	1	2	—
Vaginitis	11	8	3	—
Vaginal Abscess	5	5	—	—
Thrombosis Labiorum	3	3	—	—
Labial Abscess	4	4	—	—
Lacerated Perinæum	4	4	—	—
Cystitis	5	—	5	—
Incontinence of Urine	1	—	1	—
Ascites, Carcinomatous	1	—	—	1
Irreducible Abdominal Hernia	1	1	—	—
Ruptured Abdominal Hernia	1	1	—	—
Phlegmasia Alba Dolens	6	6	—	—
Albuminuria	3	—	3	—
Jaundice during Pregnancy	2	2	—	—
Syphilis	2	—	2	—
Mastitis	8	8	—	—
Chlorosis	12	12	—	—
Leucocythæmia	1	—	—	1
Acute Pharyngitis	2	2	—	—
Pneumonia	3	3	—	—
Pregnancy	37	37[a]	—	—
Convalescence after Labour	20	20	—	—
Total	154	136	16	2
Mortality	—	—	—	1·3 %

[a] Transferred to labour wards.

It is impossible to consider in detail all this long list of cases, but I shall bring only under your notice those possessing special features.

Hæmatoceles.—Out of a total of 450 cases, hæmatocele occurred with great relative frequency in exactly two per cent. of the entire number, the characteristic symptoms being sudden collapse, with pain in the abdomen, subnormal temperature, and a very persistent reddish discharge per vaginam, with the formation, after a time, of a well-marked tumour of the posterior *cul-de-sac*, displacing the uterus forwards. It usually occurred in women who had reached the period of greatest uterine activity, between the ages of twenty-five and thirty-four. The treatment consisted in strict rest in bed in the acute stage; no medicines were given except opium for pain, and an aperient mixture to keep the bowels open, and at a late period quinine and iron to counteract anæmia. Aspiration was employed in two cases as an aid to diagnosis; both these patients derived much benefit from the lessening of the tension in the tumour. In neither case did any reaction follow the operation. All ended in recovery.

Extra-uterine Fœtation.—Of the two cases of extra-uterine fœtation, one died. The fatal case was that of a woman, aged thirty-four, who had five children, the youngest of whom was eight and a half years old, and who was admitted into hospital February 28th, 1887, in a very anæmic condition. Her changes had ceased two months previously; she had enjoyed good health until three weeks before admission, when, as she was walking across the kitchen, she was suddenly seized on the right side by a dull aching pain, and she fell in a state of collapse on the floor; a profuse metrorrhagia set in. On examination a large fluctuating tumour was found to fill the posterior *cul-de-sac*. The uterus had a length of 10·5 cm., and was displaced forwards towards the left side; secretion well marked in the breasts. The tumour was aspirated, and four ounces of dark blood drawn off, the second syringeful being quite bright and arterial. On removing the canula a jet of blood escaped from the puncture, which was, however, easily controlled by an iodoform plug. The patient died twelve days after of peritonitis, and a *post-*

mortem by Dr. M'Kee showed that the whole of Douglas' pouch was filled with clots, which had formed a tolerably compact globular mass adherent to the posterior wall of the uterus. In this mass of clots, immediately in front of the rectum, there was a cavity in which lay a fœtus apparently of the third month. Its exact relation to the peritoneum could not be made out, but it seemed free in the pelvic cavity.

Pelvic Cellulitis.—Of pelvic cellulitis we had 24 cases, with a mortality of 2, or 8·5 per cent. Of these 16 followed childbirth; 5 gave a history of exposure after menstruation; 2 resulted from treatment; and 1 from gonorrhœal infection; only two of these cases were delivered in the hospital. The mode of termination shows some interesting facts—14 ended in absorption and 10 in abscess. Of the latter, 6 pointed over Poupart's ligament, and were opened under ether; 1 became absorbed; 2 opened into the rectum; and 1 into the bladder. The case of absorption is one of singular interest. A patient, aged twenty-five, III.-paræ, was admitted on October 23rd, 1886, six weeks after confinement, with an extensive effusion in right iliac fossa. On Nov. 6th a distinct fluctuating abscess was palpated, pointing over Poupart's ligament, and preparations were made for opening it; the operation was, however, unavoidably postponed. The following morning the tension was less marked, and the temperature had fallen, and each succeeding day we found that the abscess gradually grew smaller, and the patient's condition improved; no pus passed through rectum or bladder; the patient was discharged December 28th, the pelvic effusion having entirely disappeared.

Posterior Parametritis.—Posterior tender ligaments were frequently met with, the prevailing symptom being severe rectal pain on defæcation; the uterus, with ovaries and tubes, were generally found normal, but sweeping the finger along the posterior *cul-de-sac* from side to side caused excruciating pain, as did also the displacement of the cervix forwards. In some cases the ligaments were quite short, tense, and thickened, while in others nothing pathological could be made out. The line of treatment was as follows:—Hot vaginal douches, 110° F.; puncture of cervix and

glycerine plugs, with the internal administration of $\frac{1}{16}$ gr. of perchloride of mercury three times a day. This painful affection seems very persistent, and does not yield readily to treatment.

Tubes.—It is curious that only one case of serious tubal disease, justifying operation, occurred during the year.

Abdominal Section.—There were 15 abdominal sections (see Table IV.).

Abdominal sections were performed eight times for the removal of ovarian tumours—once to remove the ovaries in a case of uterine fibro-myoma, once to perform hysterectomy, twice for the radical cure of hernia, once for the removal of a double ovarian abscess, and once in a case of peritonitis, which proved to be carcinomatous, making in all fifteen, with four deaths.

Case No. 4 has many points of interest. The patient, aged twenty-nine, had undergone abdominal section, two years previously, for abscess of the upper wall of the bladder. A hernia had formed in the old incision. She was repeatedly advised to undergo operation, but refused. One evening, about 7 o'clock, the hernia burst, and seven hours afterwards, at 2 a.m., she was carried into hospital. We found coils of the ileum lying on the abdomen, rolled up in a dirty chemise, and matted with the hair of the pubes. The intestines were carefully washed with a 1 per cent. warm carbolic solution, several tags of strangulated omentum were ligatured and removed, the abdominal opening enlarged, and the intestines returned; but the adhesions around the margins of the opening were so extensive that Dr. Macan thought it better to postpone the operation until daylight, and, accordingly, placed a large flat sponge over the intestines, and closed the wound for the night. Next morning it was re-opened, the adhesions separated, and the abdominal wound closed by interrupted sutures. The patient recovered without any bad symptoms. Within the last few days the patient has been again operated on for a recurrence of the hernia.

The diagnosis as to the nature of the abdominal tumour in Case No. 12 was difficult. The history was as follows:—Mrs. M'G., six weeks after her last confinement, noticed a swelling in her abdomen.

TABLE IV.—*Abdominal Section.*

No.	Sent by	Name	Age	Married or Unmarried	Remarks	Result
1	Dr. M'Cormack, Corofin -	Annie M.	25	Unmarried	Ovarian Tumour - - - - - -	Recovered
2	" " -	A. P. -	40	Married -	Fibroid Tumour; Ovaries removed - - - -	"
3	Drs. Walsh and Gunning	K. L. -	30	" -	Ovarian Tumour; complicated encysted with Peritonitis -	Died
4	" " -	Mary T. -	29	" -	Ruptured Abdominal Hernia - - - -	Recovered
5	" " -	M. Mac. -	33	" -	Ovarian Tumour - - - - - -	"
6	" " -	L. S. -	40	Unmarried	Fibroid Tumour; Hysterectomy - - - -	Died
7	Dr. M'Cormack, Mayo -	C. L. -	28	Married -	Ovarian Tumour - - - - - -	Recovered
8	" "	A. D. -	40	" -	" " - - - - - -	"
9	Dr. Smith, Kinnety -	M. W. -	34	" -	Double Hydrosalpinx; extensive adhesions; Rectum opened	Died
10	" "	M. J. -	35	" -	Large double Abscess of Ovary - - - -	Recovered
11	" " -	M. C. -	47	" -	Peritonitis (Carcinomatous); Patient lingered 3 weeks -	Died
12	Dr. Craig, Derry -	M. M'G. -	28	" -	Collapsed Ovarian Tumour, with encysted Peritonitis -	Recovered
13	" " -	M. L. -	—	" -	Irreducible Umbilical Hernia; 7 months' pregnancy -	"
14	" " -	M. M'H. -	46	" -	Ovarian Tumour - - - - - -	"
15	Dr. Davis, Donabate -	M. A. -	60	" -	" " - - - - - -	"

She consulted her medical attendant, who tapped her. Within two weeks from tapping it increased so much in size as to measure 83 cm. round umbilicus, and 87½ cm. below. On inspection, abdomen was prominent in the front, not bulging at the sides; percussion gave a tympanitic note in front and low down in the flanks; the intermediate portion being dull; area of tympanitis, on front of abdomen, varied as the patient lay on one or other side, or changed her posture; on succussion a distinct splashing was heard; by palpation a positive tumour could be made out, and its margins distinctly felt. Patient's evening temperature, 102° F.; no history of rigors. The operation revealed a collapsed ovarian tumour, surrounded by an encysted peritonitis; there was an escape of gas on opening peritoneum, the fluid was sero-sanguineous in character, and the thickened peritoneum was at first mistaken for cyst wall, and a considerable portion was detached before the mistake was detected. The ovarian pedicle was ligatured and returned; the peritoneal cyst cavity was washed out with weak carbolic solution, thoroughly dried and dusted with iodoform. Patient made an uninterrupted recovery.

Uterine.—Under the head of uterine diseases, the cases possessing features of exceptional interest were those of fibrous polypi, carcinomata, and disease of the endometrium.

Polypi.—In one case of fibrous polypus from the posterior lip of the cervix there was such extensive adhesion between it and the posterior vaginal wall as to prevent the application of the ecraseur, or the twisting of the pedicle. On attempting to remove it piecemeal, with Schultz's double spoon, a dangerous hæmorrhage set in, which was, with difficulty, controlled by plugging. A secondary hæmorrhage followed, when the plug was removed twenty-four hours afterwards. In another case, where the polypus from the anterior lip had undergone sarcomatous degeneration, Schroeder's high operation for the removal of the cervix was performed. This patient presented herself for examination, two months after the operation, with a small nodule on anterior lip, about the size of a marble, which was removed, and microscopic examination showed a recurrence of the disease.

Carcinomata.—Of the total number of cases, 30, or 6·6 per cent., were carcinomata uterina—a most painful fact; and this return, when compared with previous years, shows a remarkable increase. Thirteen of the cases occurred in women about the age of forty-five, 10 were aged thirty or over, 1 was twenty-eight, and 1 so young as twenty-six. The cervix was attacked in 18, the fundus in 6, and both cervix and fundus in 6. Unfortunately, the disease was too far advanced when the patients were admitted into hospital to justify any radical operation; nothing was left to be done, except to palliate the urgent symptoms by curetting down to the healthy tissue, and thoroughly cauterising with Paquelin's cautery, the bimanual being made from time to time to avoid opening peritoneum. Hæmorrhage was easily controlled by plugging. The effect of this operation is most remarkable, causing immediate relief from pain, taking down the temperature, and getting rid of the fœtid discharge—in fact, making a previously miserable existence for a time bearable.

Endometritis.—The various cases of endometritis were treated by curetting and injections of equal parts of liniment and tincture of iodine, as described below in cases of incomplete abortions.

Emmet's Operation.—Emmet's operation was performed only once.

Endocervicitis with Erosion.—In endocervicitis with erosion the cervix was bathed, twice a week for three minutes, with pyroligneous acid, which was carried into the uterus on a Playfair's probe, armed with cotton wool. Puncture and excision of cervix were found necessary only in obstinate cases.

Miscellaneous.—Among the miscellaneous groups the treatment of incomplete abortion and the plastic operation about vagina and perinæum are of interest.

Incomplete Abortion.—The routine treatment in incomplete abortion consisted in washing out vagina and uterus with warm Vartry water through a Bozeman's catheter; the uterus was drawn down by an American forceps, and the perinæum held back by a Fritsch's speculum; the entire decidua was curetted until the curette scraped against the muscular tissue; the uterus was then again washed out, and a Braun's syringeful of equal parts of liniment and tincture of

iodine was injected. Great precautions were taken to insure a good return, by drawing the canula backward and forward so as not to increase intra-uterine tension and force any through the tubes. The patients were generally confined to bed for three days. The hæmorrhage stops at once if the part is thoroughly curetted, and in not a single case of the entire 18 had we any reaction.

Vesico-vaginal Fistulæ.—Vesico-vaginal fistulæ are fortunately much less frequently met with than formerly. All the three cases which were sent up to us were caused by prolonged labour, during which no instruments were used. In one case, a mother of five children, the urethra was completely slit up, and the anterior vaginal wall was absent, with extensive prolapse of bladder. The lesions were so extensive that no plastic operations succeeded. Plastic operations about vagina and perinæum were performed six times; the interrupted silk suture was employed in one case; in the remaining five the continuous catgut stitching the freshened surface in terraces. Only in one instance, after this method, had we imperfect union, due either to lacing the ligatures too tight, or to the cutting through of the deeper stitches while stitching the superficial lesions.

Puerperal Women.—The twenty cases of puerperal women represent all those transferred from obstetrical wards whose convalescence exceeded eight days.

Curetting.—The uterus was curetted 105 times, including incomplete abortion, 18; carcinoma, 30; and endometritis, 57, without any reaction following, showing that, when properly performed, this operation is entirely devoid of danger.

Some Methods of Examination.—The bimanual method of examination is practised and taught with the patient in the dorsal position on a Schroeder's chair. The uterine sound has been found most useful during the year as a valuable aid in diagnosticating many diseases of the endometrium; it detects with accuracy the patulous condition of the internal os, whether the mucous membrane be oversensitive, thickened, or roughened, and will demonstrate its tendency to hæmorrhage if that condition be present.

Schultz's pelvic diagrams are used to encourage accuracy of

diagnosis, and Wyder's transparent plates as illustrations of pathological conditions.

Antiseptics.—Antiseptic solutions are employed only where the hands or instruments have been engaged in septic cases. The stages of disinfection practised are, for the hands—

1st. Thorough scrubbing for a couple of minutes, with carbolic soap and a nail-brush, in a 5 per cent. carbolic solution.

2nd. Rinsing in fresh carbolic solution.

3rd. Soaking for one minute in 1–500 corrosive sublimate solution.

All instruments are disinfected by boiling in a 5 per cent. carbolic solution. For some time past irrigations of ordinary Vartry water have been employed in all ordinary operations about uterus and vagina, such as curetting in the case of incomplete abortions, and as good results have been obtained as where solutions of carbolic acid or corrosive sublimate were used for this purpose.

ON THE TREATMENT OF OBSTRUCTIVE DYSMENORRHŒA AND STERILITY.

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[Read in the Section of Obstetrics, March 16, 1888.]

The treatment of sterility and obstructive dysmenorrhœa are closely interwoven questions of great practical interest, which, up to the present time, have not been referred to in the Transactions of the Royal Academy of Medicine. Hence, although I have elsewhere considered certain aspects of these subjects, I now venture to submit my views thereon, some of which I believe will be found novel to this Academy, in the hope of inducing a discussion on one of the most frequent, and oftentimes the most difficult, of the daily-recurring problems that come under gynæcological attention.

In so doing I would premise that it appears to me in the recognition of obstruction, from either cervical or fallopian stenosis, as the chief cause of sterility as well as of dysmenorrhœa, will be found the key to the pathology and successful treatment of the great majority of cases of both these morbid conditions. These, as already observed, being intimately connected in their pathology and treatment, must be here dealt with in conjunction, although with special reference to the former. The frequency of such cases is much greater than is generally admitted, as in my hospital practice, during the past eleven years, upwards of eight hundred instances of obstructive dysmenorrhœa, or of sterility similarly caused, have come under observation in a total of seven thousand gynæcological cases that have been there noted in our intern and extern departments. Nor is the pathological importance of these complaints less striking than their frequency. Thus, of all the ailments of female existence, few give rise to greater and more

persistent suffering, or produce more disastrous effects not only on the general physical health, but also on the cerebro-nervous system, and on the moral constitution of the patient, than result from well-marked obstructive dysmenorrhœa. The importance of the last-mentioned consequence of dysmenorrhœa, to which I directed special attention in an article of mine on the Disorders of the Female Sexual Functions, in *Quain's Dictionary of Medicine*, is by no means as generally recognised as it should be. This is more especially evident in many cases of alcoholism, and I may repeat that a morbid craving for alcohol in women may very frequently be dated from their first painful menstrual period, when stimulants are too often forced by foolish mothers into the generally reluctant lips of their daughters. Once, however, the pain of dysmenorrhœa has been thus relieved, the girl at the next epoch of suffering naturally, and no longer unwillingly, seeks similar solace, until finally the victim of dysmenorrhœal alcoholism becomes an habitual, and, perhaps, an incurable drunkard.

Importance of the Study of Sterility.—The effects of the second of the morbid conditions that form the subject of this communication are certainly of no less moment, in a practical aspect, than are those results to which I have just referred as consequent on the first-named ailment—the latter involving not only the physical health and well-being of our patients, but also, in too many instances, intimately affecting their social interests, and the happiness of conjugal life. In this country, at least, the infamous doctrines of the modern votaries of "*Venus sine Lucilla*" have, fortunately to no appreciable extent, displaced the Christian view of the main function and chief end of woman's married life. Hence, in Ireland to the present time, as in Israel in the days of Sarah, to be childless is commonly regarded as a reproach to a married woman, and as a subject of marital disappointment and trouble.

Causes of Barrenness.—As in every other morbid condition so in the treatment of sterility—our first aim must be to ascertain, and our second to remove, if it be removable, the cause of the trouble for which we are consulted. Of the various causes of barrenness, some,

as for instance the absence or arrested development of the organs essential for conception—viz., the uterus, fallopian tubes, or ovariæ, being beyond remedial reach, need not here occupy our consideration. In the great majority of instances, however, sterility, occurring in women within the limits of ovarian functional vitality, admits of effectual treatment, when that treatment is rationally directed to the special exigencies of each case.

By most authorities on this subject, including even the late Dr. Marion Sims, female sterility, or reproductive inability, has been confounded with impotency or sexual incapacity. Hence, it may not appear superfluous to remind my hearers that, properly speaking, the latter term should be restricted to those cases in which marital intercourse is prevented by some physical impediment or malformation in the female genital tract—such as vaginal or vulval occlusion, imperforate hymen, vaginismus, cervical stenosis, &c., by which impregnation may be precluded, whilst sterility or imperfection of conceptive power is due to either some structural lesion, deficiency, displacement, or flexion of some one of the organs essential to conception. Thus, the uterus, fallopian tubes, or ovariæ, may each be absent, misplaced, or otherwise abnormal, or else these parts, being in a normal condition, the patient nevertheless remains sterile, either from constitutional causes or from other causes—such as sexual irrespondence or incongruity, of a moral rather than of a physical nature.

Stenosis of the Cervical Canal.—This, according to my experience, now extending over a quarter of a century, in hospital and in private consultation, at home and abroad, is not only the most frequent of all the causes of sterility, but is, moreover, the most amenable to appropriate treatment of all the physical factors in the causation of infecundity. Until a recent period, however, neither the frequency nor the rational treatment of this cause of barrenness were recognised by modern surgeons, although both were clearly pointed out by some of the older writers. Thus it was not until the late Sir James Simpson recalled attention to the plan of dilating the os uteri and cervical canal by a method which, several years previously, had been suggested by another Edinburgh surgeon, whose

ignored suggestion on the use of sponge tents in the treatment of dysmenorrhœa Simpson revived, that anything like adequate attention was attracted to this important subject. But both Simpson and Mackintosh were forestalled in their views by ancient writers, whose names had long been forgotten, and whose works had apparently become hermetically sealed by the hand of time. Hence, as I believe that the history of the steps by which modern gynæcological science has arrived at its present development are well worthy of the consideration of all who pride themselves on being members of a learned and liberal profession, I venture, in this connection, to recapitulate, briefly, a few observations which I made several years since, before a society which no longer exists, on this point.

The credit of suggesting the dilatation of the os uteri and cervical canal by means of sponge tents is, as already said, generally conceded to the late Sir James Simpson, by whom it was claimed, in a paper of his published in the *Edinburgh Journal of Medical Science* for January, 1850, in which he says—"In 1844, in a communication laid before the Medico-Chirurgical Society of Edinburgh, I proposed a means of safely opening up the cavity of the cervix and body of the uterus to such an extent as might enable us to introduce a finger into the uterine cavity for the purpose of diagnosis in the treatment of this (uterine polypi) and other morbid conditions of the organ. The means described consisted in the introduction of sponge tents into the os and cavity of the uterus, so as gradually to dilate these parts to the degree required." This suggestion was then looked on as "marking the commencement of a new era in uterine surgery." It is, therefore, not a little interesting to find that a similar method of dilating the os uteri was well known and described some two centuries and a half ago. Thus, in "The Method of Physic, containing the causes, signs, and cures of inward diseases in man's body from the head to the foot," by Philip Barrough, and "most humbly dedicated by the author to his singular good lord and master, Lord Burghley," the eighth edition of which was published in 1639, the writer, speaking of the treatment of contraction of the cervical canal and os uteri giving rise

to mechanical dysmenorrhœa, and producing sterility, &c., in the chapter entitled "Of Straightness of the Matrice," says:—"And when the places do seem to be softer to the feeling, then you must put a dry sponge, that hath a cord hanged at it, into the straight place, to the intent to make it wider, which, if it fall out, you must put in another that is thicker. Therefore, you must have many and sundry dry sponges ready." This ancient gynæcologist next refers to the possibility of these sponge tents producing inflammation in the mouth or neck of the matrice, and discusses its treatment, after which he continues—"When the inflammation is ceased, and the place is open, annoint upon a sponge a cerot made of oill of roses and goose grease, and use it untill it be healed, making the place a little sounder; but yet you must alwaies put in sponges untill the end of the cure, lest that the mouth of the womb do gather together againe."

This coincidence does not detract from the merit of Sir James Simpson, to whom suffering humanity, as well as medical science, owes so much on other scores, as one of the first modern gynæcologists to make a practical application of tents in the treatment of a condition then commonly regarded as beyond the reach of curative treatment. I may, however, take this opportunity of observing that the number of such coincidences between long-forgotten ideas and so-called modern medical discoveries is far greater than could be readily credited by those who share in that illiterate neglect of the lessons to be gathered from the experience of the past, as embodied in the works of the older medical writers, and in that ignorant contempt for their opinions and observations which is, unfortunately, too prevalent at the present day.

It is not my purpose here to refer in detail to the successive improvements which have since been effected in the methods of carrying out the gradual dilatation of the cervical canal, the most important of which were due to the late Dr. Sloan, who introduced the use of laminaria tents as a substitute for the old-fashioned and now, happily, generally disused fœtid and inefficient sponge tents; and to Dr. Kidd, who improved on Dr. Sloan's idea by the employment of a number of laminaria bougies to secure a com-

paratively more rapid and complete expansion. Fortunately, we have now passed beyond the period of gynæcological practice in which these more slow, painful, and often hazardous plans of cervical dilatation were the only methods available. No greater improvement has occurred in our branch of surgery than the replacement of these oftentimes unsatisfactory procedures by the more effective means now at our disposal for the rapid expansion of this canal. Of these, perhaps, the best known and most generally employed in this country are either Hegar's or Lawson Tait's dilators. I now desire to call your attention to another instrument which I have designed for the same purpose, and which, I venture to hope, may be found by others, as it has by myself, more satisfactory in its use in the treatment of dysmenorrhœa and sterility occasioned by stenosis.

This instrument will, I believe, be found to supply a want long recognised by gynæcologists—namely, that of a reliable and effective means of securing the rapid and permanent dilatation of the cervical canal in the treatment of stenosis giving rise to the morbid conditions now under consideration. The principles on which it is constructed differ from that of other dilators in several respects, and, above all, in one which I consider most important—viz., in producing expansion of the canal from within outwards—in other words, in imitating the natural process of expansion from the uterine cavity downwards to the os uteri; whereas other dilators,

such as Hegar's, &c., act in the opposite direction. In my own hands the utility of this instrument, the expansion effected by which may be determined and accurately measured by the affixed index, has been fully tested in a large number of cases of sterility and dysmenorrhœa in hospital and private practice. I may add that the instrument, which does not occupy more room than the ordinary

sound when introduced, may also be used with advantage for the dilatation of the female urethra in many cases in which this procedure is indicated. This instrument has been carefully made in accordance with my directions by Messrs. Arnold and Sons, West Smithfield, London.

Operative Treatment of Cervical Stenosis.—As the method I employ in these cases differs in some respects from that generally adopted, I may be here permitted to refer briefly to its details. I may observe that during the past eleven years I have operated on several hundred cases of stenosis, and within the last year I thus successfully treated in my hospital no less than ninety-eight such cases, in many of which I had the able assistance of my friend, Dr. Duke, Obstetric Physician to Steevens' Hospital.

In the first place, I would advise that this operation should be undertaken about a week after the termination of the last painful menstrual period, and that it should be preceded by daily hot water syringing for some days. To proceed with any comfort to ourselves or advantage to our patient, she should be placed under ether or mythelene, and adjusted in the ordinary left lateral semi-prone position, on a proper gynæcological couch or table. Then, the cervix being exposed by the duck-bill speculum, the anterior lip is seized by a strong vulsellum, and drawn down by an assistant as close to the vulva as possible, where it is to be retained. Next the sound should be passed to ascertain the position of the uterus, as well as the immediate permeability of the canal. Then the metrotome (and I myself much prefer Simpson's original instrument to any of its modifications) should be introduced well into the uterine cavity, and, being expanded to whatever extent may be deemed necessary in each case, should be withdrawn so as to divide the cervix freely in a transverse direction from the os internum to the outer orifice of the passage. It should be again introduced, and the same procedure repeated downwards, and again in an antero-posterior direction. The uterine cavity should now be syringed out with hot water (temp. 100°), so as to wash away all clots and arrest any hæmorrhage, then I introduce the dilator already described, and, expanding this to its full extent,

I allow it to remain for a few moments, and then withdraw the instrument, with blades apart, so as to tear asunder and distend the cut surfaces until I can pass my index into the uterine cavity. In this way any probability of either hæmorrhage or of subsequent re-union of the divided parts is effectually provided against. Lastly, I introduce a tampon of Lawton's cotton saturated in glycerine of carbolic acid, which is left *in situ* for some days so as to fill and distend the passage from the uterine cavity to the os externum. The introduction of this may be found by no means an easy matter by the uninitiated, and can best be effected by the employment of the sliding repositor.

After the operation the patient must be kept in bed on low diet, and syringed daily with hot water for eight or ten days, any pain being meanwhile treated by opiates and poultices. After this period a flexible tube or uterine stem pessary is introduced, which should be worn for another month, and then, and not sooner, the patient may resume marital life with a fair probability of subsequent impregnation, and almost absolute certainty of immunity from any recurrence of dysmenorrhœa.

With regard to the results of this operation, my experience has been most satisfactory in the curative treatment of a large proportion of the cases of sterility and obstructive dysmenorrhœa that have come under my observation. This result I ascribe mainly to the thoroughness with which I carry out the dilatation and disruption of the contracted passage in the cases referred to. And as I have been reproached by some more timid practitioners with what they regard as the rashness or boldness of my practice in this respect, I may here venture to add that when cautiously, albeit boldly, carried out, in appropriate cases and by expert hands, no ill results need attend the operation in question, and I myself have had no such reason to regret its performance. In only two cases have I seen any serious hæmorrhage after it. Nor have I found it necessary to plug the vagina in such cases, as I have seen done by some practitioners, to the great discomfort of the patient. In only as many instances has any inflammatory symptoms or cellulitis followed its performance, and in both these cases the operation had been performed by other gynæcologists previously.

Besides cervical stenosis there are other causes of obstructive dysmenorrhœa and sterility which must also be considered in this connection. Of these, perhaps the most frequent and most important is vaginismus. As, however, I have discussed the pathology and treatment of this condition in a previous paper, I need here only briefly refer to those points which bear most directly on the subject of the present communication.

Excessive sensibility of the vaginal orifice and adjacent parts, more especially when associated with such spasmodic contraction of the sphincter vaginæ as to form an impediment to marital intercourse, or dyspareunia, occasionally becomes a matter of considerable gynæcological interest in connection with the treatment of sterility. In such cases the hyperæsthetic condition of the vaginal outlet is evinced even on the slightest attempt at local examination, and is most marked about the meatus urinarius, and in the vicinity of the orifice of the vulvo-vaginal glands and fourchette, whence the hymen, if existent, projects upwards.

With regard to the pathology of vaginismus, there are almost as many divergent views as there have been writers on the subject. For my own part I think the most rational explanation of these symptoms may generally be found in the hysterical temperament of the majority of those thus affected, although in some cases there is also present an abnormal condition of the pudic nerve, one branch of which runs along with the artery to the clitoris, whilst the other, or superficial perinæal nerve, is distributed to the perinæum and labia, in which its terminal branches ratify freely. This fact in the ætiology of the disease is one the practical importance of which will be seen in connection with the treatment of vaginismus.

Treatment.—It was long since said by Dr. Marion Sims that there is "no disease capable of producing so much unhappiness to both parties of the marriage contract." I regret to say that in my own experience in some instances I have found no little difficulty in dealing with extreme cases of this kind by any of the plans of treatment generally recommended. As a rule, in the treatment of such cases very undue importance is given to local operative measures, whilst

the constitutional treatment which is invariably necessary in all instances of well-marked vaginismus is too generally neglected. For whilst excision of the hymen, division of the pudic nerve, destruction of erythematous and serpiginous patches, dissections out of neuromata, &c., may each be indispensable in certain cases, in quite as many they are unnecessary. And, from my own clinical experience, I can vouch for the possibility in some cases of relieving the most intense dyspareunia resulting from this cause, so as to enable the patient to fulfil all her duties as a wife and eventually as a mother, without any operation beyond the forcible mechanical expansion of the vaginal canal. Before resorting even to this expedient we should, in the first place, employ the sedative treatment, local and general, which is indicated in all other nervous or hysterial disorders, and which, as I believe, is essential in nine-tenths of the cases of vaginismus that come before us, whilst in only one-tenth of them is any surgical or operative measure necessary.

Amongst the topical palliative remedies that may, conjointly with the constitutional nerve sedatives just referred to, be employed in these cases, are warm baths and vaginal irrigations, local application of solution of hydrochlorate of cocain or of glycerine of carbolic acid, or the introduction of suppositories of cocain and belladonna. When such palliative measures have been fairly tried without advantage, we may then resort to mechanical dilatation of the vaginal orifice and stretching of the pudic nerve. For this purpose, having first fully etherised the patient, a large-sized Graily-Hewitt bivalve speculum should be introduced and expanded to its fullest extent. Then a tampon of absorbent lotion large enough to fill the speculum should be soaked in glycerine and passed up to the cervix, its lower end projecting through the external opening of the instrument. This, still fully expanded, should then be forcibly drawn out, leaving the central tampon behind in the vagina. It need hardly be observed that this procedure occasions severe pain. At the same time, however, it as certainly tears through some of the superficial submucous muscular fibres of the affected part, as well as effec-

tually stretches the terminal vaginal branches of the pudic nerve, and thus affords a generally efficient and safe method of overcoming the spasmodic contraction with which we have to deal in cases of vaginismus. Any subsequent contraction or hæmorrhage that may follow this procedure is sufficiently met by the tampon, which may be retained for at least twenty-four hours; and after some days, should there be still a continuance of vaginismus, the same method of treatment may be again repeated.

In some cases, however, this method of treatment does not suffice, and we must then resort to either Emmet's or to Sims's operation for vaginismus. In some instances I have found the hæmorrhage following these operations sufficiently serious, and in one of these I had to thank my friend Dr. Horne, our Hon. Secretary, who was called in in my absence, for the arrest of very alarming loss of blood, occurring some hours after the operation, in the case of a young lady on whom I performed Sims's operation.

It should here be observed that even in cases of vaginismus so extreme as to effectually prevent complete marital intercourse, the disease is not necessarily an absolute barrier to impregnation. In one instance of this kind that came under my observation some years ago, so extreme was the local hyperæsthesia as not only to preclude the probability of complete cohabitation, but also to prevent the patient's submitting to any local treatment for the relief of the morbid condition. Nevertheless conception occurred, and I subsequently was called in to deliver her at full term, and in doing so was obliged to incise the still unruptured hymen, by which delivery was obstructed.

Obstructive Dysmenorrhœa and Sterility from Vaginal Occlusion.—Amongst the causes of the morbid conditions under consideration some reference must be here made to occlusion of the vaginal passage whether by congenital malformations, or, as more frequently met with in gynæcological practice, from cicatricial adhesions the result of disease or accident. With regard to the latter, although I have met with them in several instances, our clinical experience of retained menstruation, dispareunia, and impeded delivery

consequent on post-partum adhesions of the vaginal walls, is fortunately more limited than must have been the case in the practice of our professional predecessors, in those good old days when the second stage of labour was allowed to run on until the vital powers were all but completely exhausted, before instrumental assistance was afforded in cases of difficult parturition. Nevertheless, such cases are still occasionally met with.

Of somewhat greater frequency in the causation of this condition in modern practice is the opposite error. In other words, the integrity of the vaginal canal is now more likely to be injured by the application of the forceps, before the sufficient natural dilatation of the passage, or by the misdirected force or undue haste with which instrumental delivery may be effected by injudicious practitioners.

Another occasional source of cicatricial obstruction or obliteration of the vagina is the abuse of escharotics or instruments intended for the treatment of uterine disease. It may also possibly result from syphilitic disease as well as from phagedænic ulceration or direct injuries to the vulvo-vaginal orifice.

In the first volume of the Transactions of this Academy I have referred to cases of vaginal occlusion, and I regret that time prevents my now dwelling further on this subject, as such cases appear to me of much interest, not only from their comparative infrequency, but still more from the possibility of this condition being an occasional cause of menstrual retention and an obstacle to impregnation or parturition. Moreover, they would serve to illustrate the special risk attending the surgical treatment of cicatricial vaginal obstructions. The latter point is one which should never be lost sight of in such cases. It was demonstrated by a distinguished Irish obstetrician, the late Dr. Evory Kennedy, in *The Dublin Quarterly Journal* many years ago, that the treatment of vaginal occlusion is by no means as safe as it is facile. This observation has been corroborated by more recent writers, and amongst others by MM. Bernutz and Goupil, who have shown conclusively the risk of dividing these obstructions or adhesions by any cutting instrument, and the comparative safety of digital

separation—the mortality following the use of the knife as compared with the surgeon's finger in such cases being almost as three to one.

Chronic Endo-cervicitis as a Cause of Sterility.—Lastly, we must here refer to another and much more frequent factor in the causation of obstructive sterility and dysmenorrhœa, namely, what was formerly termed chronic inflammation, and since more properly designated areolar hyperplasia, of the cervix uteri. A brief glance at the pathology of this condition will show its importance in relation to the study of sterility. Suffice it to say that the theory by which this disease was for many years ascribed to idiopathic inflammation, leading to ulceration of the cervix uteri, has been long since abandoned, except by its author, and that it is now as generally regarded as the result of passive congestion, or hyperæmia, commencing in the cervical mucous membrane, the ciliated epithelium of which is thus primarily tumefied and softened, whilst later on the whole tract of the endo-uterine mucous membrane becomes disintegrated and hypertrophied. After a little time this hyperplasia extends to the subjacent muscular structures of the uterus generally, and gives rise therein to those sero-plastic exudations and infiltrations by which the affected parts are at first mechanically distended and thickened. As the disease goes on these plastic exudations becoming organised eventuate in new connective tissue, or true congestive hypertrophy, or areolar hyperplasia of the uterus. At the same time follicular degeneration of the hypertrophied cervical glands occurs, and in their subsequent proliferation in most instances may be found the explanation of the conditions formerly regarded as the result of ulceration of the cervix uteri. The structural differences between the endo-uterine and endo-cervical mucous membrane are also of direct interest in this connection, explaining to some extent the greater proneness of the latter to hyperæmia, and the greater probability of this condition in the former being more immediately communicated to the underlying parenchyma. For whilst the ciliate membrane lining the cavity of the uterus is directly superimposed on the muscular substance, without the intervention of any sub-mucous layer, and

has numerous utricular glands, separated merely by prolongations of the uterine muscular fibre, the endo-cervical mucous membrane, on the contrary, rests on a sub-mucous layer, and is arranged in numerous folds branching off on either side from the central ridge, and thus presenting the appearance known as the *arbor-vitæ*. This membrane is lined with ciliated epithelium, and interposed between its folds are countless racemose glands or Nabothian follicles opening between the ridges of the arbor-vitæ, and under diseased conditions pouring out that viscid, white-of-egg-like secretion so generally found blocking the os uteri and cervical canal in gynæcological examinations.

In such cases the functions of the uterus are invariably disturbed. The menses are abnormal; generally they are attended by severe pain; in some instances they are diminished, but more commonly, menorrhagia as well as dysmenorrhœa results from the local congestion and irritation; and in a large proportion of cases of this kind I have observed that the abnormal menstruation recurred every third week, and lasted for six or seven days, whilst in the interval the patient was further weakened by the leucorrhœal discharge already spoken of.

Sterility almost always accompanies this disease, and as long as it exists to any serious extent the patient must remain barren. This fact, which I regard as of great practical importance, is too generally ignored in practice. I have known instances in which patients were subjected to active surgical treatment to overcome a supposed mechanical obstacle to impregnation, and who nevertheless remained childless, no attention having been paid to the existence of chronic uterine congestion, on the subsequent cure of which pregnancy has followed.

Ovarian and tubal inflammation, manifested by soreness, tumefaction, and occasionally burning pain in the ovarian region, is one of the most frequent consequences and accompaniments of uterine hyperæmia. In these cases the disease extends from the uterus, along the Fallopian tubes to the ovaries, and this to a great extent accounts for the fact I have just mentioned, that patients suffering from endo-metritis or endo-cervicitis, are sterile for the time being.

Were it not that I have already possibly exceeded the prescribed limits of time here allowed to readers of papers, I should have wished to state my experience with regard to the treatment of cases of sterility and obstructive dysmenorrhœa due, as is so often the case, to uterine flexions and displacements, or to fallopian tubal or ovarian causes, to which latter very great importance should be assigned in this connection, as well as to those just referred to. I must, however, rest content, for the present at least—as I hope to be allowed to return to this important subject on some future occasion—with having, in the foregoing communication, described the method which I have found most successful in a large proportion of the numerous cases of barrenness and painful menstruation which have come under my care in the gynæcological department of my hospital and in private practice during the last few years. Moreover, I have also pointed out more briefly the principles which I believe should guide our treatment in the other forms of the complaints alluded to. I trust that the Academy will pardon the length at which I have thus trespassed on their attention, and by the free discussion of the views I have now submitted, aid other practitioners in the curative treatment of a class of cases second to none in their importance and frequency.

NOTES ON SOME CASES OF ABDOMINAL SECTION.

By ROBERT O'CALLAGHAN, F.R.C.S.;
Surgeon to the Carlow County Infirmary.

[Read in the Section of Obstetrics, March 16, 1888.]

I HOPE that the following brief notes of some cases which I have had under my care during the past twelve months may prove interesting to this Section.

CASE I.—Mary C.—Pyosalpinx. Date of operation, March, 1887. Age, twenty-six; married two years; no children; one miscarriage nine months after marriage. Since that date she never regained her strength; menstruation became profuse and fortnightly. Ten months ago attacked with severe pain in left ovarian region, with vaginal discharge and great pain on micturition. ("There was a distinct history of gonorrhœa at this period, which was conveyed by the husband.") Active treatment at the time gave some relief; she became more or less bedridden, and had periodic discharges of "stinking corruption" per vaginam. When asked to see her, she presented the appearance of a woman very emaciated, from continued suffering and suppurative disease; pale thin face, with bright malar flush. On bimanual examination a large cyst was felt high up and to the left of the uterus; but between it a hard mass, thought to be fibroid, was felt. On explaining the nature of the case to her friends, I had in consultation my friend, Dr. William Smyly; we decided to operate at once. On opening the abdomen I found a large tube on the point of rupture, and also a tumour growing from the lateral wall of uterus and filling out the whole of the broad ligament. The tube and ovary were bound down so firmly by adhesions that I only aspirated the tube and washed it out with a 1 in 20 solution of carbolic acid; the fluid cleared the tube and passed through uterus and vagina. I closed wound without a drain; it healed by first intention. In three weeks she left her bed, and said she felt as well as ever she did in her life. I

saw her three months after; the tumour was much larger and nodulated, and she died in ten months from date of operation from undoubted malignant disease. She repeatedly asked me to operate again, having had such comfort after the operation.

CASE II.—Sarah B. April, 1887. Fibro-sarcoma. Age, seventeen, single. Previous history good. Family history good. Never menstruated. Illness traced by her to slipping on ice while carrying water, when "she felt as if something had given way inside her" in the place the tumour was now to be felt. This was six months previously. "Tumour, when first felt by her, was about the size of an egg;" grew slowly until a month ago, when it began to grow large rapidly.

Examination revealed a large nodulated tumour in the right iliac region, free from the uterus, movable anteriorly but attached posteriorly. On opening the abdomen I found a large nodulated growth attached to the outer margin of the broad ligament; this I enucleated. Hæmorrhage at the time being brisk, but the capsule not being very dense, I was able to shell it out quickly; tied the bleeding bed of tumour in one large ligature (pedicle silk), excised the remainder above ligature, washed out the peritoneum, put in a drain; wound healed rapidly; removed drain on third day, and patient had not a bad symptom throughout. Tumour weighed 3 lbs.

CASE III.—Catherine L. November, 1887. Cancer of peritoneum and ovarian tumours. Age, fifty-two; married; four children, all living—youngest eleven years. Previous and family history good. She had been a very strong woman up to menopause three years ago. She noticed a year ago that she was larger in the left iliac region, and did not seek advice until the tumour had grown so large as to cause great discomfort—dyspnœa, constipation. She then consulted a medical man, and was treated for ascites by giving violent purgatives and diuretics, which, I need hardly add, made her case an unfavourable one for operative interference. However, after explaining to her family my view of the case, at her earnest request I decided to operate, and, to my great delight, found my diagnosis correct. On introducing the trocar (Tait's) a thick gelatinous fluid oozed out very slowly. I emptied out the cyst, passed my finger down to pedicle, found it clear of malignant growth; but on trying to separate adhesions

above I found the top of the cyst (which filled the whole abdomen) adherent to the peritoneum, and the part *so* adherent a sago-like mass. On trying to separate this I found the cyst wall broke away like wet blotting-paper, and the peritoneum about it was studded with hard ivory-like nodules, so well described by Sir Spencer Wells in his remarks on cancer of the peritoneum. There was little or no hæmorrhage. I ligatured the pedicle, as taught by Mr. Lawson Tait, and removed cyst; on so doing found a smaller cyst full of clear fluid, which I also removed; then washed out the abdominal cavity with tepid water from the tap until it flowed out clear. I was obliged to leave the upper and anterior portion of cyst adherent, as I found it impossible to strip it. Wound seemed to heal by first intention, but patient sank from exhaustion in sixty hours.

There was nothing in this case to point to malignant disease; no glandular enlargement; abdomen, on palpation, was perfectly even. Had I seen her three months previously I am certain I would not have to record her death, as it was quite evident that the malignant disease was secondary in the tumour, and of *very* recent date.

Case IV.—A. F. Dec. 1887. Parovarian cyst. Age, thirty, single. Menstruation regular. Previous and family history not good. Sent to me as a case of ascites. No albuminuria or symptoms indicating hepatic mischief. Slight swelling giving no inconvenience; commenced six months ago in left iliac region, extending rapidly over abdomen during the past two months; although much distended, there was not great discomfort, all the symptoms pointing to ovarian dropsy. I opened the abdomen and found a large cyst with no adhesions; a slight pedicle, long and thin, which I tied with Mr. Tait's knot in Chinese silk. The incision was only two inches in this case; wound healed by first intention, and temperature normal throughout.

Case V.—Mary G. Strangulated umbilical hernia, with radical cure. Age, fifty-five, married; weight, seventeen stone. Old hernia was strangulated thirty-six hours; when I saw her, symptoms very urgent. I did a laparotomy in this case, twisting and tying the sac, with a gratifying result. I only mention this case incidentally, as I intend reading a special paper on this case at a future date.

Remarks.—With the exception of the first case, when I had the valuable advice and assistance of my friend, Dr. William Smyly, I had no further aid than that of my efficient Lady Superintendent. Dr. W. O'Meara gave ether in three cases and Surgeon D. M. O'Callaghan, A.M.S., in the others; so that in the Provinces one labours under some disadvantage; for you who have had any experience of abdominal surgery know well that you may meet with many complications not bargained for when you open an abdomen, and under such circumstances you would feel some comfort with one or two experienced colleagues by your side. But again, I have the advantages over you in the city, of pure country air, few spectators, and private wards; these, with skilful nursing, being great features in the success of such cases.

I used pure water from the tap for ablution, with Alembroth gauze and wool dressing. I am sure you will agree with me that this brief history of these few cases helps to prove the utter nonsense we were taught with regard to the sacred precincts of the abdomen, and that with *absolute* cleanliness and dry dressing, in my experience true antiseptic surgery, the surgeon, provided he has special knowledge of the work, with the essential surroundings heretofore alluded to, can explore the abdomen for diagnosis, or for removal of disease, from which a few years ago many valuable lives were lost through uncertainty of diagnosis, or from fear of surgical interference. This state of things, I am happy to say, is now of the past, thanks to the brilliant results which have been achieved in abdominal surgery by Mr. Lawson Tait, who has opened a new era in surgery, and enabled us to hold out hope of relief to many suffering mortals, if not total immunity from their affliction.

NEW OPERATION FOR REPAIR OF LACERATED PERINÆUM.

By ALEXANDER DUKE, F.K.Q.C.P.;
Obstetric Physician to Steevens' Hospital; Ex-Assistant Master of the Rotunda Hospital.

[Read in the Section of Obstetrics, April, 1888.]

I WISH to bring before the notice of my gynæcological brethren an operation I have designed for the restoration of a lacerated perinæum, which is easy of performance, and which will, when properly executed, form a good perineal floor, and I might almost say practically a new perineal body. The patient having been prepared by the usual preliminary steps required for the old operation, when under the influence of an anæsthetic is placed either in the lithotomy or Sims's position, the left index finger being introduced almost its entire length into the rectum, a long straight double-edged bistoury is made to pierce the tissues in front of the anus at right angles to the vulva; and, guided by the finger in the rectum, is made to penetrate the septum for 2½ inches upwards, the incision being enlarged laterally to two inches at least as the knife is withdrawn.

On the two points of incision being pressed together from side to side a lozenge-shaped opening appears, and when all the sutures required have been introduced and are properly adjusted and approximated, the two cut surfaces are brought into direct apposition.

The sutures are introduced by a strong sickle-shaped needle with eye in point mounted on handle, strong silver wire being the suture preferred. The needle is introduced at centre of skin incision below and guided by the finger in rectum, is made to travel over cut surface to its full extent above, describing the arc of a circle, and, on the point of needle appearing directly opposite, it is threaded with suture and drawn through.

On the ends of this suture being pulled together by the fingers a good idea can be formed of how many additional stitches may be

required. When all considered necessary have been introduced and approximated, a finger of each hand passed into rectum and vagina will at once recognise the gain in thickness of septum, the external tissue being pushed fully an inch forwards from anus, and forming a thick and solid perineal body.

The incision being a deep one, on union taking place between the raw surfaces a considerable depth of support must be afforded where a pessary is required, or where there is much tendency of the uterus or vaginal walls to prolapse. My experience of the operation, although up to the present limited, has satisfied me with the results, and, there being no loss of tissue whatever, should the operation fail it cannot add any difficulty to a subsequent one.

If some gynæcologists possessed of larger opportunities will give the operation a trial I shall not be afraid of the result.

Even should the perinæum be lacerated to very verge of anus what I describe can be done. I find that leaving the sutures for only three days is best, but if I fear the union is not strong I cut the wire leaving it *in situ* for a day or two longer, thus affording some support and relieving the strain on the edge of suture holes, and I also support the parts by long strips of adhesive plaster carried from hip to hip over new perinæum.

The wire should be stout silver wire and not too tightly twisted. My friend Dr. More Madden has kindly given my operation a fair trial, and he is much pleased with the results, especially in one of his cases where the old operation of denuding the surfaces had been tried previously and failed owing to the patient's poor state of health and want of healing power. The advantages of my operation are briefly these :—

1. The simplest of performance as yet proposed. No danger of hæmorrhage, the surfaces being brought together at once; wound dry and clean.

2. No danger of sepsis as the incision is not open for the admission of any discharge from either vagina or rectum during healing process.

3. No loss of tissue, and consequently no harm done should the operation fail.

THE MANAGEMENT OF THE PERINÆUM DURING DELIVERY.

By J. RUTHERFOORD KIRKPATRICK, M.D., Dubl.; F.K.Q.C.P.;
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[Read in the Section of Obstetrics, April, 1888.]

I HAVE adopted the term "management" of the perinæum in preference to that of "support," as the title of this communication, my object being a three-fold one—

First, to notice and compare the directions given in the most recent works on obstetric medicine—directions very different, very contradictory; some very old but introduced as new; some harmless, others highly extolled by one, as loudly condemned by another; some, on the one extreme, recommending a perhaps too officious treatment; on the other hand we find those whose line of proceeding is that of doing nothing.

Secondly, I wish to explain and recommend the method I have adopted for some years past, in preserving the perinæum from injury during the birth of the child, with far more satisfactory results than I formerly obtained, when following the old plan of "supporting the perinæum."

Thirdly, I hope to have the benefit of the opinions and criticisms, both favourable and the reverse, of those whose long experience and practical knowledge fully entitle them to state their views.

It will be allowed by most, if not by all, that during the first two stages of labour when the head presents, it is at the latter portion of the second stage that the attending physician's care and assistance is most useful and effectual to the parturient woman, more particularly if she is a primipara.

For, although laceration and injury to the perinæum may occur during delivery in those who have safely passed through previous

labours, still the danger of laceration during birth of the child is much less likely to occur at each subsequent labour, with proper care, if the woman has escaped injury previously.

I will now proceed to examine and quote from some of the modern standard works on Obstetrics, the directions laid down for the guidance of the student in midwifery, as to his management of this portion of labour.

Of those in the English language, I will select Playfair and Barnes (English writers), Lusk, Goodall, and Parvin (American), Leishman (Scotch), Spiegelburg (German), the new Sydenham Society's translation, as among those mostly studied or read at present.

From a few others, some of them older and less read authors, I have been induced to make some extracts also.

I will begin with Playfair. He says :—

"As the head descends more and more, the perinæum becomes distended, and there is considerable difference of opinion amongst accoucheurs as to the management of the case at this time.

"In most obstetric works, the practitioner is advised to endeavour to prevent laceration by the manœuvre that is described as 'supporting the perinæum ;' by this is meant laying the palm of the hand on the distended structures and pressing firmly upon them during the acme of a pain, with the view of mechanically preventing their tearing.

"There can be little doubt that this, or some modification of it, is the practice now followed by the large majority of practitioners.

"The term 'supporting the perinæum' conveys an unquestionably erroneous idea, and it is certain that no one can prevent laceration by mechanical support.

"If the term 'relaxation of the perinæum' was employed, we should have a far more accurate idea of what should be aimed at, and if this be borne in mind I think it cannot be questioned that nature may be most usefully assisted at this stage."

In his own directions how to proceed, and exemplified by the wood-cut (fig. 105), he says :—

"If, when the head is distending the perinæum greatly, the

thumb and forefinger of the right hand are placed along its sides, it can be pushed gently forward over the head at the height of the pain, while the tips of the fingers may at the same time press upon the advancing vertex, so as to retard its progress if advisable.

"By this means the sudden and forcible stretching of the perineal structures is prevented, and the chance of laceration reduced to a minimum, while nature's mode of relaxing the tissues by dilatation of the anal orifice is favoured.

"We need only intervene to assist relaxation when the stretching has reached its height, and the head is about to be expelled."

Robert Barnes (vol. 2, p. 32), on "The Care of the Perinæum," "believes there is now a general consensus of opinion in favour of supporting the perinæum."

"The proper time to give support is when the head is gliding on through the vulva, stretching the perinæum, thinning it out, so that it threatens to burst."

How to support the perinæum—"During the expulsion stage a finger is applied from time to time to the head and carried back to the edge of the perinæum, to take note of the advance of the head and of the degree of stretching of the perinæum."

"Support duly rendered may help in two ways:—

"First, the palm of the hand so spread out as to rest upon the coccyx behind and upon the pelvic floor, retarding the too precipitate exit of the head, giving the soft tissues time to stretch, and by directing the head under the pubic arch excess of pressure on the edge of the perinæum is avoided.

"Secondly, by pushing forward skin from behind and the sides, the capacity of the perinæum is somewhat increased.

"Support is given during the pains and remitted during the intervals.

"Laceration may begin in two ways—First, and most commonly, by tearing at the extreme edge, and then the rent may extend backwards in the median line.

"Secondly, the perinæum bulging out in the middle may burst at this part, and the rent may run forwards through the fourchette and backward through the sphincter ani; or the child may be

driven bodily through the central hole, the edge of the perinæum in front keeping entire.

"The extended palm of the hand well supporting the pelvic floor will obviate the latter accident, and that lengthening the perinæum forwards and directing the advancing head well under the pubic arch, will much lessen the risk of tearing at the edge of the perinæum."

Ramsbotham (p. 131) says:—"For the purpose of supporting the perinæum, we sit rather behind the patient and apply the palm of the left hand, guarded, for the sake of delicacy, cleanliness, and convenience, with a soft napkin, steadily and firmly against the perinæal tumour.

"To give the required protection it is not necessary that we should make powerful pressure, nor resist the child's exit by the employment of any exertion; we are only to afford a passive support.

"Placing our elbow on the bedstead we render it a fixed point, and rather allow the head covered by the thinned structures to be protruded against our hand, than forcibly press our hand against the head.

"We may occasionally be compelled to remain many hours by the side of the bed without moving from our seat."

Leishman (p. 302) says:—"The most important point, however, connected with this stage of the process is undoubtedly the support of the perinæum," which he condemns "as irrational and useless in all cases, and undoubtedly hurtful in some."

"The practitioner who never puts his hand to the perinæum will, we firmly believe, have fewer cases of ruptured perinæum in his practice than he who admits support in any form as applicable to every case of labour."

Ramsbotham's directions (as quoted elsewhere) receive very severe condemnation "as a relic of 'meddlesome midwifery,' in which we presume by irrational and bungling interference to dictate to nature."

"The proper management of this stage," he proceeds, "consists in watching the amount of pressure to which the perinæum is being subjected.

"Should this exceed the normal standard, so as to imperil the integrity of the tissues, we must then order all aids to expulsive efforts to be removed from the reach of the patient, and at the same time encourage her to cry out lustily during the height of a pain.

"Should circumstances render it expedient to oppose the advance of the head, with the view of rendering the process of dilatation more gradual, this should be done, not by pressure on the perinæum, but by pressure exercised directly upon the head of the child, which is to be pressed towards the hollow of the sacrum."

Robert Collins (p. 3) says:—"When the head has descended so low as to form a tumour on the perinæum, great attention is to be paid to prevent laceration, during not only the expulsion of the head, but also the shoulders.

"This will be best accomplished by pressing gently forward the distended perinæum with the palm of the hand, having a soft napkin interposed, and in this way endeavouring to keep the back part of the head as close to the arch of the pubes as possible, without using strong pressure, or applying our force so as to tend in the slightest degree to drag the perinæum *backwards.*

"The patient should at this time, where the tension is great, be earnestly enjoined to avoid bearing down, and thus permit the head to escape *slowly* and *gently.*"

Johnston and Sinclair (p. 25) say:—"During the second stage of labour, more especially with primiparous women, great care was directed toward the support of the perinæum, but not until the head had pushed the structures beyond the nates—in other words, when a large tumour occupied that particular region.

"The support was only maintained during uterine action; and it was considered that the hand, without any napkin intervening between it and the parts, save just over the anus, and a little distance from its verge, was the best practice, since by this means a more equable and exact sustaining power could be rendered, and the rate of progress better estimated.

"The right hand was used for this purpose, after either of the following manners:—Sometimes the ulnar edge of the hand was

made to rest across the posterior boundary of the perinæum, and the cleft between the thumb and forefinger to correspond to the edge of the posterior fourchette.

"At other times the heel of the hand was placed so as to correspond to the posterior boundary of the perinæum, and the hollow formed by the palm and fingers gently grasping the distended structures, made to form a continuation, in a direction forwards, of the curve of the sacrum and coccyx.

"The support was always forward, towards the central point of the arch of the pubes.

"Although particular attention was paid to the following out of this practice, there happened, nevertheless, and that often, *slight* lacerations."

M'Clintock, in his edition of "Smellie's Midwifery," mentions Wallace Johnson as the first British author to insist upon supporting the perinæum as a duty of the accoucheur in every case (System of Midwifery, 1769).

His (M'Clintock's) own rules in the discharge of this duty are few and simple:—"If the head be advancing too rapidly and before time has been given for the full dilatation of the external orifice, I forbid the patient using any voluntary expulsive efforts, and I administer chloroform to moderate the pains. Should the perinæum be rigid or inflamed, let it be diligently fomented with a sponge wrung out of very hot water. Abstain from making pressure on the perinæum until the head is just about emerging from the orifice. Let the escape of the head through the vulva be very slow and gradual, its advance being regulated not by pressing on the perinæum, but by two fingers of the left hand placed upon the protruding vertex, and directing it forward as much as possible. These precautions for preserving the integrity of the part should not be relaxed until the shoulders have passed the outlet, as they often cause or increase the laceration."

Matthews Duncan, describing (p. 55), "the Curves of the Developed Genital Passage," says:—"There is to be noted also, in connection with this curve, the inevitable tendency of the force of labour, not merely to distend the perinæum, but also to rupture it

centrally, to force the presenting part through it—a tendency the study of which, apart from other considerations, leaves no possible doubt as to the expediency of the practice of supporting the perinæum, a practice which can be demonstrated to favour the maintenance of its entirety."

Goodall (p. 95) says :—"The problem seeking solution is this :—Given a fœtal head and a vulva through which it must pass, how can the perinæum be kept from tearing?

"One advocates pressure on the perinæum with a folded napkin, another with an unfolded napkin, a third scouts all napkins, whether folded or unfolded, one plugs up the rectum, another empties it. The perinæum is pushed forward by some and backwards by others. Some place their hand transversely across the perinæum, some longitudinally with the fingers looking upwards, some longitudinally with the fingers looking downwards.

"And yet the perinæum tears, and tear it will until woman becomes, like the cherubs of the old masters, all wings and no body. Now, all this diversity of opinion means that nature herself intends to take care of the perinæum, precisely as she does the preceding stages of labour, and that she can very generally do it better than the physician. But, suppose that the case is a morbid one, and really needs help, or else that you cannot, for the life of you, keep your hands off, what is to be done? Why, imitate nature. She retards the too rapidly advancing head, and that by making the woman cry out, which at once stops the expulsive pains. You will retard the head by making direct pressure—direct pressure, I say, on it.

"By supporting the head, we support the perinæum; make, then, your support or retarding pressure directly to the head itself, and not to the perinæum, not through a fleshy medium, which needs perfect freedom from all restraint in order to undergo the requisite and inevitable amount of dilatation.

"For many years I have not touched a perinæum, for the purpose of saving it. Sometimes I do nothing; at other times I make simply a retarding and guiding pressure with my fingers and thumb spread over the head of the child as it crowns. When the

perinæum is very rigid, I relax it by hooking up and pulling forward the sphincter ani, with two fingers passed into the rectum, while with the thumb of the same hand I make the needful restraining pressure upon the head."

For this method he claims several advantages.

Lusk (p. 207) says:—"By far the most delicate task which the physician has to fulfil towards his patient in the expulsion stage consists in so regulating the exit of the child's head as best to avoid perineal lacerations.

"Measures to avert rupture may be classified under three headings:—

"First—Those designed to check the exit of the head before the fullest expansion has been secured, and to prevent expulsion during the acme of a pain, when the borders of the orifice are most rigid.

"Second—Measures which impart an upward movement to the head, with a view of making all unoccupied space beneath the arch of the pubes available.

"Third—Measures which favour expulsion during the interval between pains, or, at least, after the acme has subsided."

Lusk then describes several of the methods already alluded to, and recommended by other writers:—Hohl's method, Ritgen's Rectal Expression, Goodell's, Fasbender's, &c., &c., and his own. "In cases of rigidity, of alternately drawing the chin downward through the rectum until the head distends the perinæum, and then allowing it to recede by the simple repetition of this to and fro movement, the parts rapidly becoming soft and distensible.

"When rupture is felt to be imminent," he says, "mock modesty should be discarded, and the parts imperilled should be unhesitatingly exposed to view. If, owing to its excessive elasticity, the occiput, in place of being directed forwards to the vulva by the perinæum, distends the latter so that central perforation threatens, the hand should be applied in such a way as to give direct support to the stretched tissues and to guide the head upward (forward) to the outlet. If the danger is from defective elasticity, the physician standing to the right of the patient, with his face towards the foot of the bed, should pass his left hand between her thighs, and press

the head upward and inward during a pain, with the thumb and two fingers. At the same time, the movement of extension, should it threaten danger to the parts, should be hindered by pressing backward upon the frontal region through the perinæum with the disengaged hand."

Parvin (p. 407) says:—"Usually the most important of the obstetrician's active duties in the second stage of labour is protection of the perinæum from being torn during delivery of the head and shoulders of the fœtus."

He then presents a brief statement of various means that have been or are employed, for the protection of the perinæum. Quoting from many authorities, both old and modern, he believes that supporting the perinæum is a practice not likely to be abandoned, or to be replaced by rectal expression or by hip-bandages.

He then describes and recommends the following plan:—

"The patient lying upon her left side, her hip quite near the edge of the bed, the practitioner places his right hand so that the concave palm receives the convexity formed by the bulging perinæum—the thumb upon the right and the four fingers on the left labium, while the fold between thumb and index finger corresponds with the anterior margin of perinæum. Moderate resistance is made to the force driving the head against the perinæum, and at the same time the head is gently pressed towards the pubic symphysis; no napkin should be interposed between hand and perinæum; the hand is not to be applied until distension begins, and only during a pain.

"The left hand is passed over the patient's upper thigh and grasps the fœtal head in the manner directed by Hohl (the thumb above or in front, according to the woman's posture, the fingers below or behind, reaching to the anterior margin of the perinæum), holding it back when necessary, and at the proper time guiding its exit in the axis of the vulvar orifice, and facilitating extension."

Spiegelburg (the new Sydenham Society, p. 258), says:—"When the head reaches the vulvar aperture and pushes the pelvic floor before it during the pains, the perinæum must be protected from laceration.

"The perinæum is, therefore, to be protected by facilitating the extension of the head round the symphysis, as a centre of rotation, and at the same time by allowing the head to emerge so slowly that the elasticity of the perinæum may be fully developed, and that its anterior portion can retract over the head.

"It will depend on the conditions of the individual case, which of the two indications is the chief one to be attended to—whether to promote the extension of, or to delay the head. For carrying them out, both hands are generally required; one of them lies on the perinæum, so as to exert the desired counter-pressure, the other acts on the head itself.

"It is better when the two hands co-operate with each other, and it is a good plan to bring the force leading to the extension, and to retardation, to bear mainly on the head itself, and to allow the hand which is lying on the perinæum in the main to simply watch its behaviour, and if necessary to strip it off from the advancing head."

Spiegelburg prefers the lateral posture for the woman, from the possibility of directly observing the perinæum, and at the same time of fixing the pelvis more satisfactorily.

"The accoucheur sits behind the strongly flexed woman, who should lie with her hips close to the edge of the bed, and lays one hand (bare) flat on the perinæum, the thumb on the upper, the fingers on the lower labium. The other hand is carried above the upper thigh to between the two thighs, and placed on the advancing occiput, while the arm steadies the woman. The emerging part is now delivered according to the principles that have been stated.

"The fingers lying on the head may, as necessity arises, raise it up or hold it back during a pain, or strip off the tense edges of the labia and the posterior commissure of the vulva.

"The hand lying on the perinæum must closely follow the head; especially while the anterior portion of the perinæum is being retracted over the vertex, forehead, and face, must the perinæum be carefully watched and held evenly against the head, so that retraction shall take place slowly, for it is now that laceration is most apt to occur."

I here conclude these, perhaps, too extensive extracts, in the number and length of which I have been tempted to exceed the limits I proposed to myself when first chosing this subject for discussion.

For many years it was my custom to carry out the mode of supporting the perinæum that I had been taught when a student at the Rotunda Hospital.

The directions given by Robert Collins, formerly Master of that Hospital, and one of the oldest of the authors from whose writings I have made extracts, best explain this manner of giving support, as taught by him and his successors in that hospital.

They are nearly the same as those given by Johnston and Sinclair, and, with some slight differences (by no means generally improvements), by several subsequent writers.

This mode of supporting the perinæum I do not now trust to myself or recommend to others. I found it insufficient—I do not say injurious. It is a difficult matter for a student seeking for information and guidance on this subject to discover for himself the line of practice safest to be followed out.

One recognised authority tells him very plainly what he is to do at this stage of labour to avoid laceration.

Another equally popular author gives him perfectly different directions, and a third tells him that he will only be doing mischief and injury to his patient if he follows in either of these paths, and that he will only be acting rightly by putting his hands in his pockets and keeping them there, while he sits by and watches the expulsion of the fœtal head.

As a teacher of midwifery, I have explained to those attending my lectures these various methods, with their advantages and disadvantages, and what I thought would prove most efficacious in preventing laceration of the perinæum.

But I would not feel myself justified in teaching the doctrine of the "fatalist":—"If the perinæum is to be ruptured you cannot prevent it; if it is not ruptured, you have not had anything to do with preventing it. Sit still or stand by and nature will act all for the best." I do not believe this to be true, and neither teach nor practise it.

I could not, as Goodell says, "for the life of me, keep my hands off," during all this period of labour, and only look on.

I wish particularly to impress my advice carefully to *watch* the perinæum from the time the head begins to make decided pressure on it during a pain, and not to be satisfied by only marking the progress by the finger at the margin of the fourchette.

Some few months ago I was attending a primipara in labour, who, previously to her pregnancy, had been under my treatment for very well-marked vaginismus, and retroflexion of uterus. Both these troubles being cured, pregnancy was the result, after more than two years' sterility. Her labour had made satisfactory progress. The head had not long begun to press, and the occiput was appearing and advancing through the vulva, in a perfectly normal manner with each pain.

Chloroform was being administered with the two-fold object of moderating expulsive action, and lessening suffering, when suddenly I observed the skin just in front of the distended anus and posterior portion of the perinæum begin to give way, the integument opening to the size of a shilling, fortunately only superficially.

By the free administration of chloroform, and keeping all pressure of the head off the part by every means in my power, delivery of the head was accomplished without any further extension of mischief, or any laceration of the perinæum in front. After delivery there was a circular opening in the skin, not communicating either with vagina or rectum, which contracted and healed perfectly in due time.

But I had a very anxious few minutes, and I am sure if I had not been carefully watching and had not seen the commencing tear, central perforation of the perinæum, and most likely expulsion of the child through the rent, would have been the unfortunate result. It is one of Lusk's recommendations, "When rupture is felt to be imminent, mock-modesty should be discarded, and the parts imperilled should be unhesitatingly exposed to view." I go further and say, don't wait till you feel the peril. Mock-modesty never enters into my head, and I have never found a patient object to my doing what I consider best for her safety at this time.

I will now, as briefly as I can, explain the method I have adopted for some few years in the management of the latter portion of the second stage of labour.

It differs from, or at least is not the same, as that recommended by any authority, so far as I can find out. The method described by Spiegelburg is that it most nearly resembles; but it was not from Spiegelburg I obtained it, as I did not read his work till the "New Sydenham Society" placed it in my power to do so last year.

The patient being in the usual left lateral posture, as is usual in this country, her hips quite near the edge of the bed, I administer chloroform during the pains towards the close of the second stage, unless it is contra-indicated by some self-evident cause, such as weak uterine action; it is most useful in moderating the often uncontrollable expulsive action in a primipara. Many a patient in the absence of chloroform, no matter how you urge her to cry out and not bear down, is quite unable to attend to your directions, or cease the tendency to bear down with all her might.

I carefully watch the progress of the advancing head bulging the perinæum, gradually more and more with each returning pain. I do not make any pressure on the perinæum with either hand. Up to this time the hand pressed over the sacrum during a pain gives support and comfort to most; some object to it, and, if so, omit it.

If the distending perinæum appears dry or unyielding, the application of hot fomentation may be useful. Use lubricants freely over the distended parts.

As soon as the vertex shows at the vulvar opening, if it is advancing with each pain, I stand beside the patient, pass my left hand between her thighs in front, and place the four fingers of that hand on the head, just in front of the anterior margin of the distended perinæum, making steady but quite gentle pressure at first, with the pulp of the extremities of the four fingers kept close to one another, with the object of preventing too rapid advance of the head, or sudden extension movement, and also to press the head forward under the pubic arch. When the pain ceases I remove my fingers from the head, keeping them, however, ready to act again, when the pain returns; and so on as the head advances

more and more. I cause the pulp of the fingers to take, as it were, the place of the anterior edge of the perinæum, thus allowing the head to pass and glide under my fingers, the extension taking place with little or no strain on the anterior edge of the perinæum, which now retracts over the forehead and face to below the chin, without tear or injury.

It is my opinion, contrary to very high authority on this subject, that laceration of the anterior margin of the perinæum, be it slight or severe, is caused generally by the movement of complete extension which the head undergoes at the moment of birth, splitting up the perinæum as a paper-knife divides the pages of a book.

If we can regulate this movement of advance and extension of the head, keeping the pressure off the perinæum by substituting the pulp of the four extremities of the fingers, till in succession the vertex and anterior part of the head is past the perinæum, the chief danger is over—care, of course, being still taken during the passage of hand or elbow, if present, and shoulders as well.

The advantages gained by this method are—the absence of all, or any, pressure by either hand on the perinæum, the least possible interference with the normal advance of the head in the proper direction under the pubic arch, the prevention of its too rapid expulsion, and the keeping off pressure from the anterior edge of the perinæum during the actual birth of the head.

I have not alluded at all to the operation of "Episiotomy," either as to its necessity or advisability in certain cases as a means of avoiding laceration. Nor do I wish to express any opinion in favour of or against it, as I have exceeded the limits of my time and your patience in the remarks I have already brought before you.

I must apologise for the extent and number of the extracts I have given from the authorities I have quoted from; but the variety of the methods recommended was so great in diversity and number, that I was tempted to far exceed what I had intended at first.

REMOVAL OF THE RIGHT UTERINE APPENDAGES.

By R. D. PUREFOY, M.D., F.R.C.S.;
Obstetric Surgeon, Adelaide Hospital.

[Read in the Section of Obstetrics, May 25, 1888.]

About two years ago, Mrs. A., a young, healthy woman, consulted me at the Adelaide Hospital, complaining of frequent burning pain in left side extending into leg, greatly increased by exercise, which also was generally followed by distressing headache.

Menstruation was very painful but not profuse, and intercourse had become so painful as to be almost intolerable. These troubles had begun shortly after marriage, and had slowly increased in intensity, but unattended by any well-marked pyrexial condition. They dated from an illness which, from the patient's account, was probably a miscarriage at the third month, attended with severe hæmorrhage and pain in right side. At next menstruation pain recurred, and was seldom absent again except for short periods. For some months previously to the operation not even a day's freedom from pain was enjoyed. On examination the uterus was found retroflexed, and behind it, and to the right side, a rounded tumour with fluid contents, about two inches in diameter, very movable, and having on its surface at one point a small nodular body very sensitive to pressure. Without much hope of benefit, I tried for a time the use of various pessaries and constitutional measures without any benefit, and the patient's suffering continued so great that she readily consented to an operation for the removal of the tumour, whatever it might be. My first idea was that it might prove to be a simple broad ligament or par-ovarian cyst, at the same time it appeared to me that the possibility of its being a pyo-salpinx made the operation of tapping per vaginam a proceed-

ing of questionable propriety. The removal of the tumour was rendered a little troublesome by thick, fat abdominal walls, and my anxiety to remove it without escape of its contents. In this I am happy to say I was successful, being much assisted by Dr. Smyly, who elevated the uterus for me by making pressure upwards per vaginam. The cyst is thin-walled, nearly three inches in diameter, having the ovary (which is enlarged) loosely attached to it, as well as about two inches of the Fallopian tube. Her convalescence was perfectly satisfactory, though much retarded by parotiditis on the left side, which only very slowly subsided after causing the patient and myself some anxiety. The uterus is now (some months after the operation) normal in position and healthy. Dysmenorrhœa and dyspareunia have ceased, and her only trouble is an occasional backache. In these cases the temptation to tap the tumour is certainly considerable, especially as in many recorded instances it has been successful; but, against this, it is well to remember that the entire removal of these tumours is generally easy and safe, and by it we escape the risk of infection of the peritoneum by the papillomata sometimes present in them.

CASE OF PELVIC HÆMATOCELE CURED BY OPERATION.

By JOHN A. BYRNE, M.B., Univ. Dubl.;
Gynæcologist to St. Vincent's Hospital.

[Read in the Section of Obstetrics, May 25, 1888.]

I am induced to bring this case under the notice of the Obstetrical Section for several reasons:—

1st. It is a comparatively rare affection.

2nd. It is sometimes a fatal one.

3rd. It is not always easy to form a correct diagnosis between it and other pelvic and uterine affections.

4th. The novelty of the mode of treatment adopted in the case.

Mary Cullen, aged thirty-four, was admitted into St. Camillus' Ward on March 8, 1888.

History.—She has been married for eight years. She had five children, all of which she nursed. The last is fourteen months old; she nursed the child to within a month or so before her admission. During lactation she menstruated at the tenth month—that is to say, four months ago. Notwithstanding this she continued to nurse, but no change appeared until about four weeks ago, when a discharge came on, which has continued since, with interruptions. For the past few weeks she has experienced pain of an undefined character about the pelvis and the uterine region, but she did not pay much attention to it until it had attained to that intensity of suffering, within a week before her admission, that she was compelled to apply to the hospital for relief.

She had no suspicion that she was pregnant during the latter part of lactation, nor did the circumstance of the menstrual flow coming on cause her any uneasiness, and it was only the violence of the pain which caused her to apply for medical aid.

Symptoms on Admission.—Her countenance was pinched, and had that peculiar expression characteristic of abdominal trouble. Her pulse was 100 and her temperature normal.

There was a very well-marked and distinct enlargement in the supra-pubic region, which extended to either iliac region; it was prominent and visible. The hand, when placed over the pubis, felt a convexity hard and unyielding. There was absence of resonance on percussion. She could not bear the slightest pressure, and she described the pain to be of so severe and continuous a character, that motion, even in bed, was attended by a feeling of great tension, pain, and bearing down. She could not sleep, and she felt, to use her own words, as if her inside was bursting.

Rectal and Vaginal Examination.—On introducing the finger into the vagina, a distinct prominence of a solid character was felt in the posterior vaginal wall; this intruded on the vaginal space, and to such an extent that the os uteri was pushed far up behind the pubis, and it was only by considerable trouble that it was reached and the sound withdrawn; it revealed normal measurement but complete displacement of the uterus out of pelvis into the abdominal cavity.

Rectal Examination.—The rectal examination made simultaneously with the vaginal, showed the entire rectum to be filled with a hard globular mass; there was scarcely room to pass the finger into the cavity. This tumour was painful, of a globular form, and lay down upon the superficial sphincter; the rectum was so filled up by it that it scarcely admitted the introduction of an elastic tube; this was required from time to time, and the rectum washed out; the mucous surface was very vascular, and bled at the slightest touch.

She experienced the greatest difficulty in passing water and in defæcation, and indeed those troubles, combined with the severe pain, were becoming more developed day by day.

This dysuria and obstinate constipation can be explained by the presence of the double tumour in the rectum and vagina, pressing the bladder upwards and forwards and the rectum backwards.

Pelvic Hæmatocele—Diagnosis.—For six days I had her under observation before I determined to relieve her, and here is a tolerably accurate history of her symptoms during that period:—

Since her admission her sufferings have increased rather than decreased. She lies on her back, her knees slightly drawn up. She complains of a constant gnawing pain, as she terms it. There is a feeling of great tension all over the lower part of abdomen. She cannot bear pressure or handling of the tumour. The swelling in the supra-pubic and iliac regions has increased a little—not

much; it is evidently not being diminished; it is more tense; examination pressure is more unbearable; the face expression of suffering is more marked; the dysuria is more troublesome, requiring the use of the catheter; the constipation constant. One day the temperature indicated 101·2°; her tongue is dry; she has a good deal of thirst; she is always in pain, always in dread; any motion in bed aggravates her sufferings; there is no diminution of vaginal or rectal swellings; she cannot rest without morphia; she has very often an inclination to vomit; she implores relief; she has been for some days in this dangerous condition, and notwithstanding all medical treatment she is not improving. Yet there is not any decided change for the worse; but it is evident that relief must be given, and that promptly.

Reasons for Operation.—I reasoned thus:—I have come to the conclusion that it is a case of blood effusion into the cellular tissues about the pelvis, uterus, and neighbouring organs; so far the peritoneum is not perforated, but it may be at any moment, and then all the terrible phenomena of sudden rupture and collapse will set in, terminating most probably in the death of the woman.

The patient was a most intelligent woman, and not only consented to the operation, but implored to have it performed, so distressing were her symptoms.

Operation.—She was placed opposite a strong light, in the usual obstetric position; her bowels were washed out with a warm water and Condy injection; this, as I have said before, had been done daily, often per hour; yet it was an advisable proceeding; the urine was drawn off by the catheter.

My friend, Dr. M'Naboe, the house surgeon, exhibited the ether and chloroform, and Dr. A. Duke lent me his kind aid.

Having examined the ground carefully, there appeared two sites where a puncture might be made, either in the posterior wall of vagina, or through the rectum. I am well aware that most of those who recommend puncture (when absolutely necessary) recommend the vaginal puncture; the reasons which induced me to select the rectum being the following:—

1st. The great size of the presenting mass in the rectum, as compared with that in the vagina.

2nd. Reflecting on the history of some of those cases which have been described, in all of which, when nature made an opening, the exit was by the rectum.

3rd. The presence of the sphincter, which would close and pre-

vent the entrance of air into the opening; this, however, did not influence me much in making the puncture in the place selected, but the result proves that the place selected was the correct one—I do not say in all such cases, but at least in this individual case.

Having held back the posterior wall of the rectum by a retractor, the large bulging tumour could be felt pressing down upon the sphincter; it occupied the whole of this region—in fact, it almost lay upon the superficial sphincter; the surface was very vascular, and bled when touched; this was due to the presence of some large turgid veins.

The point of a medium-sized exploring needle was introduced into the most prominent and depending part of the swelling; the covering was very dense. At first no blood came. A larger-sized needle and trocar was then passed, and the blood began to stream through the canula of the needle.

The aspirator was then adjusted and used, and, to my great satisfaction, about one quart of very dark fluid blood came away. There were no coagula, only a few minute shred-like threads. There was not the least appearance of pus, nor of serum; it was all blood, very fluid, and had evidently been effused for some time, as it was very thin, and there had been no attempt at clotting; it was utterly devoid of fœtor.

I then passed in my left index finger, enlarged the opening, and washed out the cyst with a solution of water and tincture of iodine. She was completely drained and removed to bed, and a suppository of morphia introduced.

A sensible diminution of the tumour became manifest on the withdrawal of the fluid.

Twelve hours after operation.—She is very easy; passed water, and has slept.

The cyst was washed out with a solution of water and Condy. On this occasion a few coagula came away. A drainage-tube was placed in the opening and a suppository placed in the rectum.

Twenty-four hours after operation.—Has passed a very good night; urinated freely; no pain; no rigor. Temperature, 99·2°; pulse quiet, 84. Has no vomiting. No symptoms of peritoneal complication. On examination the tumour is very much diminished; no apparent attempt at being refilled.

It was washed out by the double-current canula, with Condy solution and warm water. No coagula came away.

Forty-eight hours after operation.—Progressing most satisfac-

torily. Tumour diminished. Uterus almost completely restored to its natural position. Urinates freely. No pain. No rise in temperature. No tenderness over abdomen. Ordered a little wine, and a morphia suppository at evening visit.

It is needless to follow up the daily details of progress. I will just mention that she never had a rigor, never had a rapid pulse, never a critical temperature. She slept well, there being no motion from the bowels for seven days. On the 8th day the bowels moved spontaneously. There was no expulsion of fœtid gas from the opening. A slight discharge of fluid came occasionally afterwards from the rectum. I examined her from time to time. The opening gradually closed—receded into the pelvic cavity. It appeared to have a vascular formation. I prevented it from closing for some days by passing my finger into it, and thus I could feel the position of the cyst, and this washing out of the cyst was the only thing to be done.

In fine, she continued to improve. Menstruated from April 29 to May 2. The flow was quite natural. I need scarcely say that this period was one of anxiety, it being the first since she came under my observation. However, everything passed off quietly; there was no fresh addition to the size of the tumour, there were no coagula, or blood, or pus, and she was discharged on the 15th May.

Remarks.—I will not trespass upon the time of the Section by entering into any lengthened observations upon this affection, but a few remarks may not be out of place.

Although this is one which, when we take into consideration the anatomical and physiological peculiarities of the female pelvic organs, must at all periods have been possible, yet the first notice which has been recorded of it was by Ruysch, in 1691, who accidentally discovered blood effused into the peritoneal cavity in making a *post mortem* examination of a woman who died during the menstrual period. Since then the subject has been investigated by many eminent observers—Recâmier, Velpeau, Bernutz, who were amongst the first to describe it accurately, and to point out the sources of the hæmorrhage. Since then large contributions to the literature of the subject have been made by M. Nélaton, Voisin, Pugh, Trousseau, Tilt, Emmet, Bennet, West, Simpson, Barnes, Duncan,

Edie, &c., &c.; and a most clear and admirable account of it has been given of it by the late Dr. A. M'Clintock in his work upon Female Diseases.

Dr. H. Macnaughton Jones, in his valuable Manual of Gynæcology, has devoted a chapter to this subject, which is well deserving of perusal. Dr. M'Clintock was the first, however, in this country to direct the attention of the profession to a case which occurred in 1860. He was also the first to designate it pelvic hæmatocele.

It is a curious fact that this term—hæmatocele—was originally given by Celsus, Heister, and others, to that affection produced by laceration of vessels and effusion of blood into the areolar tissue of the scrotum. There can be no possible objection, in my opinion, to the use of this term when applied to similar blood effusions in the areolar tissue about the female organs in the pelvis, for it means nothing more than a bag or cyst of blood, and is a term applicable to hæmorrhage in any site where areolar tissue abounds. Now, when we consider for a moment the anatomical arrangement of the ovaries and Fallopian tubes, and the abundance of areolar tissue about those organs in the broad ligaments, &c., we cannot but admit that there is ample space to accommodate effused blood, and when, moreover, we consider the great networks of arteries and veins, and the changes and derangements which are constantly occurring during active uterine and ovarian life, it is only a matter for surprise that this phenomenon of rupture of a vessel and effusion of blood, or in some cases perhaps of exudation, is not of more frequent occurrence; yet that it rarely happens is a recognised fact. It is possible, however, that slight hæmorrhages may be of more frequent occurrence than is supposed; and it is, moreover, possible that there may be occasionally slight blood effusions, but so slight that they pass by unheeded and unsuspected, or are mistaken for some other condition; but in my opinion those extensive effusions of blood occur but rarely. I cannot recal to mind more than two other instances, in private or hospital practice, in which I have recognised it for a certainty; in none of them was there any necessity for interference—they recovered spontaneously. In one of them the late Dr. M'Cilntock

saw the case in consultation with me, and he concurred with me in the diagnosis. In both instances the patients recovered. The effusions were slight, and they occurred at the menstrual period.

This spontaneous recovery by absorption is, indeed, what generally happens in cases where the effusion is slight. It must be remembered that I am now speaking of that terrible cataclysmal form, so termed by Barnes, where there is a rapid and sudden hæmorrhage into the cavity of the peritoneum, and which is nearly always fatal.

Dr. M'Clintock speaks in a similar manner of the rarity of this hæmorrhage, as seen by him—and his experience was very large; however, he states that he had, from time to time, met with cases in which his later experience would lead him to think, from the symptoms present, and which were inexplicable at the time, that subperitoneal sanguineous effusions had taken place; but during his long career of hospital and private practice he can only point to three cases in which he was certain of its being the disease.

ANALYSIS OF HIS CASES.

		Result
1st.	Opened spontaneously into the rectum	Recovery
2nd.	Opened spontaneously into the rectum	Recovery
3rd.	Opened spontaneously into the rectum Suppurative symptoms. Death occurred after nine months' suffering.	Death

Remarks.—With regard to the first cases, the rectum was the part selected by nature for an exit for the blood. With regard to the last case, what evidently occurred was this:—Nature endeavoured to make an outlet per rectum; suppurative and hectic symptoms supervened, the system was exhausted, and the woman sank from this and septicæmia.

Is it not possible, nay probable, that had a bolder proceeding been adopted, and the cyst punctured or freely laid open, and washed out antiseptically, that the result in this last case would have been more favourable?

Now I shall, in a very brief manner, allude to the treatment of

cases of subperitoneal pelvic hæmatocele—a nomenclature which is to be preferred, I think; and before doing so I will ask permission to make an

OBSERVATION.

In all the text-books—and they are numerous—a very accurate distinction is attempted to be made as to the site of the blood effusions. Thus we have classified:—

Ante-uterine hæmatocele.
Retro-uterine hæmatocele.
Peri-uterine hæmatocele, &c.

Now, there is one very important thing to bear in mind in considering this subject—viz., the disposition of the peritoneum upon the surface of the uterus.

We are all aware that it is very intimately attached to the surfaces and sides of the unimpregnated uterus, and it is difficult to imagine that any effusion of blood can dissect away the peritoneal covering. Consequently, when blood is effused—I am speaking now of the subperitoneal form—that blood would be contained in a cyst or cavity (if you will) formed in the areolar tissue of the broad ligaments and Douglas' space; it would require a great stretch of the imagination to suppose that this blood could dissect the peritoneum from the uterus. Now, the consequence of this is that, as a rule, this cyst or cavity will be irregular in shape, and wherever there is the greatest amount of tissue there the effusion will be greatest, and the uterus will be displaced in the opposite direction. If the peritoneal membrane were dissected off the uterus by this effusion the uterus would lie bathed in the effused blood, but the uterus, not denuded of peritoneum, is pushed upwards or downwards, or backwards, or to either side, or anywhere room can be found in the pelvis or lower abdomen, and thus, as I have stated, the whole pelvis is occupied, in a case such as I have detailed, and the uterus and bladder are pushed out of their normal pelvic position.

I am not aware of any case in which the denudation of the peritoneum from the unimpregnated uterus has been proved, and I have never seen a preparation in any museum illustrating it.

Treatment.—Hence the treatment must depend upon—

1st. The amount of the blood effusion.

2nd. The site of the effusion.

3rd. The amount of inconvenience.

4th. Upon the estimate of the danger of its becoming changed into the cataclysmic form, the intra-peritoneal, in which case death will most probably occur.

5th. Upon the symptoms indicating septic poisoning.

If the effusion is slight and very limited, my opinion is that we should temporise—adopt palliative treatment—cold, absolute rest in bed, opiates to allay pain if necessary, ergot to restrain further hæmorrhage, and to watch carefully the case.

If the effusion be very considerable; if it form a distinct tumour in the abdomen; if, in addition, a swelling can be felt in the rectum and vagina, completely blocking up those spaces, and thus preventing completely the performance of necessary functions of the bladder and rectum; if the pain be excessive, as in this case; if the tumour, under all those circumstances, be not decreasing, but, on the contrary, be increasing; if the tension be becoming extreme—do not adopt the Fabian plan of treatment, but puncture the sac, using the strictest antiseptic precautions, and the result will probably be a favourable one. Delay and hesitate to give relief, and the result will most probably be the reverse; either the cyst will burst suddenly into the peritoneal cavity and the result will be collapse and death, or the patient will be worn out by protracted suffering, and a natural exit will be formed which may, after a time, close up, or else the blood will become degenerated into pus, the cyst will become a pyogenic membrane, and the distressing train of events, terminating in death, will set in, as in the case mentioned by M'Clintock.

Should this latter event occur, do not hesitate for one moment to puncture and give free exit to the pus formation.

Conclusion.—It must not be supposed that I advocate rash interference; on the contrary, my opinion is that we should wait for a certain time, and then, should there be no chance of the fluid being absorbed, we should not hesitate to give immediate relief. I did

so in this case, and with the happiest results. I kept the woman under observation for some time, used the usual palliative treatment, observed the case carefully from day to day, found that it was not decreasing, that very probably it was increasing; and then, fearing a fatal *dénouement*, I punctured it, gave exit to a large quantity of blood; and the result was success.

The Place of Puncture.—Now let me say a few words as to the place of puncture.

Barnes and others who have written upon this subject, recommend puncture through the vaginal wall into the cyst. I have not been able to find out any author who has recommended puncture through the rectum. Serious objections are urged against puncturing through the rectum septigeminæ—the escape of gas and fæces into the cavity from the opening, &c. Well, I have already given my reasons for having adopted the rectal puncture, and the result was successful. I have no objection to the vaginal puncture, but if I am the first who has given exit from a cyst of blood through the opening per rectum, it is at all events a proof that it can be done without encountering all those fearful consequences mentioned by authors; that if we adopt proper precautionary measures we need not fear much evil consequences; and that, moreover—and upon this I wish to lay particular stress—we are but following the guiding of Nature's hand, which, as we see, in most cases causes the fluid—blood or pus—to endeavour to make its exit per rectum.

NOTE.—Since writing the paper read at Section of Obstetrics, I was present at an operation by Dr. Heywood Smith, in London, in which he made an opening per rectum into a rectal tumour; it contained fœtid pus; about three pints were removed. Drs. Jones and Smith kindly asked me to be present.

ON MYXOMA OF THE CHORIONIC VILLI, OR VESICULAR MOLE.

By THOMAS MORE MADDEN, M.D., F.R.C.S. Ed.;
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President, Obstetric Section, British Medical Association, &c., &c.

[Read in the Section of Obstetrics, May 25, 1888.]

The practical importance of the ætiology of all forms of intra-uterine death, the continued obscurity of their pathology, and the great difficulty of their prevention, may render the following cases and observations on one of the most important of these causes of embryonic destruction of some interest:—

Case I.—L. D., aged twenty-eight years, the mother of four children, had a miscarriage at the second month, early in December, and was admitted to St. Monica's Ward on April 15th, in a state of extreme anæmia from uterine hæmorrhage, from which she had been suffering ever since the date of the abortion. The day after admission I rapidly expanded the cervical canal with the dilator I recently exhibited to the Academy, so as to allow the introduction of my finger into the uterine cavity, whence I removed a large mass of firmly adherent placental structure, which was found to have undergone vesicular or myxomatous degeneration. The enlarged uterus was then curetted, and subsequently brushed out with Churchill's iodine; the patient was put on large doses of liquor ergotæ, together with tincture of perchloride of iron, under the influence of which the uterus speedily regained its normal size; the hæmorrhage ceased, and within ten days she was enabled to leave the hospital.

The history of this case is very similar to that of another instance of the same disease that I met with some years since, and to the particulars of which I may therefore very briefly refer:—

Case II.—E. G., aged thirty years; married; eight children; admitted May 9th, suffering from persistent uterine hæmorrhage, which had continued since November last, when she miscarried at the seventh month. On admission she was in a state of great

exhaustion, and completely blanched from loss of blood. Her pulse was 120, and so feeble as to be almost imperceptible at the wrist; and she complained of tinnitus aurium. The hæmorrhage was now a slight but incessant draining, with occasional gushes of blood on every exertion. Stimulants having been given, the uterus was examined, and found to be considerably enlarged. The os was contracted, but sufficiently dilatable to allow the introduction of a faggot of sea-tangle tents; after which the vagina was securely plugged with sponge. On removing the tents next morning the cavity of the uterus was found occupied by a large hydatidinous mass attached to the fundus. The removal of this growth, which filled a small hand-basin, and of a small portion of firmly adherent placenta from which it grew, was attended by considerable hæmorrhage, which was arrested in the ordinary way, and the patient made a rapid recovery.

This case was the first instance that I met with in which a large myxomatous growth was developed from a very small portion of adherent placenta, continuing its abnormal vitality for five months after childbirth, and under circumstances which prevented subsequent impregnation. A fragment of the retained placenta, on examination, proved to be in a state of fatty degeneration.

Importance of the Study of Placental and Embryonic Disease.—The history of all cases of placental disease appears to me deserving of record, since in the comparative paucity of communications on this subject in our "Transactions," we find sufficient evidence that these diseases have even yet attracted less attention than their practical importance demands. It should, perhaps, be here observed that I include vesicular mole amongst placental diseases, inasmuch as, from my own experience and observation, I can confirm the views of those who hold that in such cases the disease generally begins in the placental chorionic villi, and thence the cystic proliferations extend through the intervening tissues into the parenchyma of that structure. The obscurity of their origin, and the difficulty of diagnosis in these cases, have—since the publication, many years ago, of the late Sir James Simpson's memoirs on this subject—been to some extent cleared away by the papers on placental diseases of Dr. Robert Barnes in the "Medico-Chirurgical Transactions," and

by those of Drs. Graily Hewitt and Braxton Hicks in the "Transactions of the London Obstetrical Society," and above all by the elaborate researches of Virchow, and by Dr. Priestley in his recent work, "On the Pathology of Intra-uterine Death." Notwithstanding all this, however, no subject of equal interest in a practical as well as in a physiological point of view remains in greater obscurity than the diseases of the placenta. It would be superfluous to dwell on the importance of this still neglected field of investigation, or to do more than observe that being, as it is, the sole medium of vital communication between the fœtus *in utero* and the mother, any deviation from the normal condition of the placenta by which its development may be arrested and its physiological action impaired or perverted must be of serious consequence either to mother, or to child, or to both.

Various Forms of Placental Disease.—Amongst the diseases of this organ affecting the mother as well as the child are inflammations of the placenta, especially chronic or subacute placentitis, leading to morbid adhesions between the afterbirth and uterus, and occasionally giving rise to the two most serious complications of parturition—viz., *post-partum* hæmorrhage and inversion of the uterus. Another placental disease of no less importance to the mother than to the child is congestion, sometimes resulting in hæmorrhage or placental apoplexy; whilst amongst the placental diseases which chiefly affect the fœtus by impairing or destroying the structural integrity of this organ are œdema, atrophy, and hypertrophy of the afterbirth, and the various forms of degeneration—fatty and calcareous; and, above all, that now under consideration—viz., vesicular, or myxomatous, or, as it was formerly termed, hydatidiform degeneration. In my own practice I have now met with five cases of this disease, the infrequency of which appears from the following table:—

Authority	Cases admitted into the Rotunda Hospital	Cases of Hydatidinous Disease reported
Dr. Collins - - -	16,654	–
Drs. Hardy and M'Clintock	6,634	1
Drs. Sinclair and Johnston	13,748	4

Thus it appears that in 37,036 cases admitted into the Lying-in Hospital, there were only five instances of hydatidiform mole recorded, being in the proportion of 1 in 7,407 cases.

Vesicular or hydatinous disease of the placenta consists in degeneration and abnormal proliferation of the placental chorionic villi, usually following, although occasionally producing, the death of the fœtus. In the old "Dublin Obstetrical Transactions" and elsewhere I related several cases of this kind. In most of these the hydatidiform mass was expelled from the uterus in the fifth month. In some instances, however, such growths are expelled earlier, as in a case published by Dr. Moorhead, of Weymouth, in which a hydatidiform ovum was produced at about the tenth week by a woman, aged fifty, who had not had a child for twenty years before. In other cases it may be much later, as in my second case, also in one related by the late Sir James Simpson, in both of which the patients reckoned themselves gone beyond the full time of utero-gestation; and in another, given by Mr. Ley, of South Molton, in which the woman was supposed by herself and by her medical attendant to have gone the full term of nine months. The symptoms of this disease can at first hardly be distinguished from those of ordinary pregnancy. If, however, in addition to the signs that usually denote the death of the fœtus, the patient experiences occasional gushes of water, together with slight hæmorrhage from the uterus, lasting for a short time and recurring at irregular intervals, we may suspect the existence of hydatidiform disease in the placenta of a blighted fœtus. The expulsion of these growths from the uterus is generally attended with severe hæmorrhage.

History of this Subject.—At a time when I had more leisure than is now at my disposal, I collected the opinions of many of the older authorities on the character of these growths, and some few of their views thereon may possibly seem to others, as well as to myself, of sufficient interest to warrant their brief recapitulation in this connection.

The first of these theories is that of Hippocrates, who, in the treatise "On Airs, Waters, and Places," ascribes the occurrence of uterine hydatids to the effect of drinking marsh and stagnant

waters. Dr. Adams, in his learned commentary on the work of Hippocrates, says:—"It may appear singular that hydatids of the womb should be peculiarly prevalent in the case of women that drink unwholesome water from marshes, and yet our author's observation is confirmed by a modern authority, as quoted by Coray:—'Il a été également prouvé par les observations des modernes, que les fausses grossesses produites par les hydatids sont très-communes dans les pays marécageux où la plupart des habitans ont une constitution lâche, propre à l'affection scorbutique qui y est presque endémique, qu'elles se terminent plus ou moins tard par l'excretion de ces hydatids.' "[a]

A full account of the ancient doctrines on this subject may be found in Crooke's *Μικροεμοτραφία*, published in 1651. And as that work is not very commonly met with at the present day, I regret that the space at my disposal only suffices for a few lines of quotation from this very curious volume:—"To perfect conception," says our author, "there is further required an *εὐκρασία* or laudable temper of the womb: for those whose wombs are either hot or cold, or moist or dry above measure, does not conceive, as saith Hippocrates. If, therefore, any of these things be wanting, we cannot hope for a lawful conception, but either there will be none at all, or a depraved and vicious, such as is of the moon calf or *mola*. For Nature rather endeavoureth an imperfect and depraved conception than none at all, because she is greedy of propagation, and diligent to maintain the perpetuity of the kind of things: whereupon, rather than she will do nothing, she will endeavour anything how imperfect soever."[b]

One of the most interesting "Exercitations" in "Harvey's Treatise on Generation" is that in which mention is made of this subject. Harvey observed that these substances are usually expelled in the early stage of the supposed pregnancy, and his ideas on the point appear to coincide with those of Hippocrates generally.[c]

[a] Hippocrates Translated, with Annotations. By Francis Adams, LL.D. Sydenham Society Edition. Vol. I., p. 197. London. 1849.

[b] *Μικροεμοτραφία*. A Description of the Body of Man, together with the Controversies and Figures thereupon belonging. By Helkiah Crooke, Doctor in Physicke, Physitian to His Majesty. Folio. London. 1651. P. 219.

[c] Harvey on Generation. Exercitation the 56th, p. 420. Edition of 1653.

already familiar to the Academy. On the latter point I shall therefore merely add that the majority of recent authorities support the views concerning the pathology of vesicular mole or, as it is sometimes termed, myxoma of the chorionic villi, which are clearly expressed in the late Dr. Spiegelberg's "Text-book of Midwifery,"[a] an English version of the first volume of which has been lately published by the New Sydenham Society.

The vesicular or cystic mole, according to Spiegelberg, consists of a conglomerate of vesicles filled with pale, and for the most part clear, fluid, which are surrounded by the decidua, and in places project through it. They vary in size from a walnut to a millet seed, and are connected with each other by thin threadlike stalks.

The vesicles are degenerated chorionic villi. The degeneration consists of an abundant proliferation of the villi, and of hypertrophy of the internal mucoid matrix of the individual villus, the nuclei and cells increasing like the intercellular substance. In the fresh condition each vesicle has an epithelial covering; next to this comes the ground substance consisting of a closer tissue with small stellate cells, which are connected with the separate fibres of the tissue. The substance forming the stalks is very much like *Wharton's jelly* and consists of a firm mucous tissue, whose fibres are arranged longitudinally and pass imperceptibly into the homogeneous layer of the vesicles. The fluid contained in the latter shows a great similarity in composition to liquor amnii, but in addition to albumen it contains comparatively much mucin.

If the vesicular mole is formed at a *very early date*, as is the rule, the whole surface of the ovum undergoes degeneration, the embryo perishes, is disintegrated, and no remnant of it can be found. When the degeneration sets in after the *placenta is formed*, it is limited to the latter, although the whole surface of the ovum generally appears on superficial observation to be covered by the cysts; the fœtal cavity in this case is usually very distinct, and the remnant of the embryo or even the whole (atrophied) fœtus is

[a] A Text Book of Midwifery. By the late Otto Spiegelberg. Translated from the German by J. B. Hurry, M.D. New Sydenham Society, London. 1887. Vol. I., p. 451.

present in it. Sometimes a simultaneous increase of the liquor amnii takes place. Degeneration of certain lobes of the placenta in the midst of healthy ones—*partial myxoma*—indeed in some places in different cotyledons, is also met with, and under such conditions no injury need result to the fœtus.

The vesicular mole with a healthy fœtus has several times been seen. The *cause* of the hyperplasia of the villi is unknown. It is undecided whether it indicates primary disease in the ovum, or depends on some irritation due to disease of the internal surface of the uterus, or to the maternal blood. That it is not a consequence of a very early death of the embryo, as is still often supposed, is clear, even though the villi may possibly continue to grow for some time after the death of the fœtus. Such a supposition is contradicted by the rarity of vesicular moles, compared with the much more common early death of the embryo, by this pathological growth occurring after the formation of the placenta has begun, by the fact that atrophied embryos are met with in the moles, and by the cases of partial degeneration. The death of the fœtus must therefore be looked upon as a consequence of the degeneration. The view which seeks to explain such degeneration by a morbid condition of the uterine mucous membrane (decidua) is supported by evidence of such disease obtained in different ways, and by the cases of partial degeneration. In those cases, however, in which no disease can be found in the uterus it becomes probable that the cause of the hyperplasia is to be sought for in an *anomalous development of the allantois*, all the more so as vesicular structures have also been observed in the umbilical cord. This view can also explain those cases of the degeneration of one twin ovum side by side with a normal second twin.

Vesicular Moles without Impregnation.—The question as to the probable occurrence of vesicular moles independently of impregnation in some instances, may be one of great importance in reference to the character of the patient. On this point Dr. Priestley has expressed a very decided opinion. This question, he says, came before a Court of Inquiry in India some years ago, and involved both the character of an unmarried woman and the reputation of

a medical man whose opinion had impugned her chastity. The medical man collected the opinions of all the leading obstetricians in this country, and, although the balance of opinion greatly preponderated in favour of vesicular chorion being always the result of impregnation, there was at least one notable dissentient, who believed that the vesicles might be formed in the virgin uterus. We now know so accurately the way in which these vegetations are produced that doubt should no longer exist on the matter. With our present knowledge it would be just as reasonable to suppose that a child might be expelled from an unimpregnated uterus as a true vesicular chorion.[a] For my own part, loath as I am to differ from so eminent an authority on this subject as Dr. Priestley, and although I have not myself met with cases of vesicular mole which were not accompanied by the ordinary history and symptoms of pregnancy, I nevertheless agree with my old friend, the late Dr. Montgomery, that even yet "our knowledge on this point is by no means sufficiently precise, nor our collection of facts sufficiently extended to warrant us in pronouncing positively on the question, or asserting decidedly in a case of suspicion that a woman was pregnant merely because she discharged hydatids from the uterus." Nor can there be any doubt that several apparently well-authenticated cases that would seem to support the contrary opinion have been recorded by authorities whose veracity is unimpeachable. Thus Dr. Samuel Ashwell, in his treatise "On the Diseases of Women," speaking of the vesicular mole of the uterus, says:—"I have seen, at least, one example where they were the result of diseased action of the uterine lining membrane, independently of sexual intercourse."

Mr. Douglas Fox, Surgeon to the Derbyshire Infirmary, also reported the particulars of a case "in which a large mass of vesicular hydatids was expelled from the uterus of a maiden lady, where the hymen was unruptured, and of whose chastity there could not be a suspicion." Somewhat similar cases have been related by Dr. Hamilton, Dr. Fischer, and other writers.

[a] The Pathology of Intra-uterine Death. By Wm. O. Priestley, M.D. London. 1887. P. 112.

It would be useless here to refer further to this question, or to review the many theories that have been suggested in explanation of such cases at different times. For my own part, I still adhere to the views I have maintained for many years on this subject—viz., firstly, that in the great majority of cases these growths originate in the cystic degeneration, or proliferation, of the exochorionic villi of a blighted ovum. Secondly, that cases, however, may also occur in which similar-looking products are found in the uterus, independently of impregnation. Thirdly, that the few well-authenticated and exceptional instances of the latter kind may probably be accounted for on the supposition of their origin in the ovary itself, and that the diseased ovum is thus primarily vitiated ere its arrival in the uterus, where it subsequently becomes adherent, and whence it continues to derive nutrition for its abnormal vitality and cystic proliferation or monstrous development, until, by its bulk, expulsive action is produced.

Treatment.—In the way of treatment I know of nothing that can be done to arrest the progress of the disease, but an attempt should always be made to prevent its recurrence by improving the general health of the patient by alteratives and ferruginous tonics, especially any of the saline chalybeate waters, such as Ems or Kissengen abroad, or Tunbridge Wells and Lisdoonvarna at home.

It has been recommended that we should bring on the expulsion of these vesicular moles as soon as they are discovered. This, however, is clearly wrong practice; for it is quite possible that only a portion of the placenta may be affected; or, as I have seen, the birth of a healthy living child may be immediately followed by the myxomatous placenta of a blighted twin conception. Hence, even if this disease could be diagnosticated at any time during the nine months of pregnancy, we should still let nature take her course, rather than by unnecessary interference run the risk of destroying a living fœtus which experience has shown may possibly co-exis with the vesicular growth *in utero*.

SECTION OF PATHOLOGY.

CASE OF EPISPADIAS.

By JOHN VINCENT LENTAIGNE, F.R.C.S.;
Surgeon to the Mater Misericordiæ Hospital.

[Read in the Section of Pathology, November 4, 1887.]

The deformity known as epispadias, which is commonly defined as a deficiency in the anterior wall of the urethra, is of sufficient rarity to make me think it worth while to bring forward the case I have shown to-night.

The subject, as you have seen, is a fine, healthy-looking boy, three years old, who seems to be normally formed in every respect, except that the urethra, instead of being situated in the usual position, is represented by a slit or furrow lined by mucous membrane on the dorsum of the penis.

This furrow extends along the junction of the corpora cavernosa, and a little more than half way down the dorsum of the glans in the median line; it, however, does not reach the extremity of the glans. Above the root of the penis we see an opening from which this furrow extends. The urine flows out through this opening, the margin of which is lined above, as far as can be seen, by normal skin continuous with that of the lower part of the abdomen. There is a perpetual but slight dribble of urine from this opening; but the boy's mother informs me that at times a considerable quantity is voided in a distinct stream. A No. 5 catheter, when passed through this opening, penetrated for a depth of two inches; when introduced, the point could be directed backwards, upwards, or to either side, but not downwards. The urine flowed out through the catheter and along its sides. Each time I

introduced the instrument, after a sufficient interval, a tablespoonful or more of urine flowed out in a distinct stream, giving evidence of the presence of a cavity in which this fluid had collected.

The prepuce is represented by a large and loose fold of skin, hanging by a kind of frænum from the under-surface of the penis at its junction with the glans; it is also partly attached to the under-surface of the glans.

The scrotum is normal, and contains a pair of testes, also apparently normal. The case is thus one of complete epispadias without extroversion of the bladder.

Epispadias in any form is a comparatively rare deformity; when complete, it is almost invariably associated with extrophy of the bladder.

The form present in this case is extremely uncommon. Agnew, writing in 1881, states that there had been but one recorded case—that described by Dolbeau—of which an autopsy was obtained. No one has yet given any satisfactory explanation of the deviation from the normal which produces this deformity, and it may, perhaps, help us a little in this direction if we look back over the history of this region in the embryo.

In the fifth or sixth week we find a cloaca or common cavity, which subsequently divides into the anus behind and the urogenital canal in front, the latter ultimately becoming the urethra.

Immediately in front of this cloaca is found a tubercle—the genital tubercle which subsequently forms the penis and scrotum. The division of the cloaca takes place about the second month. It is not definitely known how the septum is formed, but it is generally supposed to result from a growing-in of the sides of the cloaca. Now, if we could imagine the genital tubercle to be situated on the side of the cloaca and to be included in the tissue which grows in to form the septum, so as to be ultimately situated behind, instead of in front of, the urogenital canal, we should find a state of things which might reasonably be expected to result in a condition similar to what we find in this case.

CASE OF PHLEGMASIA ALBA DOLENS.

By E. H. BENNETT, M.D., F.R.C.S.;
Surgeon to Sir P. Dun's Hospital; Professor of Surgery, Trinity College.

[Read before the Section of Pathology, November 4, 1887.]

The patient, a girl of fifteen years, was admitted on the 30th September, 1886, into Sir Patrick Dun's Hospital, and remained there until the 27th of June, 1887, when she died. When admitted she had phlegmasia alba dolens affecting the whole of the left leg, which was distended with hard white œdema. She was extremely emaciated and anæmic, and her œdematous leg was in strong contrast with the rest of her body. There was great difficulty in assigning any cause for the ailment, pregnancy and parturition being entirely out of the question. She suffered from great gastro-intestinal irritation, which was complicated with vomiting and diarrhœa, accompanied by pain.

So prominent were these symptoms that at first we thought that the case might be one of typhoid fever, which was even approaching the stage of recovery. The course of the case put that diagnosis out of the question. There was always great abdominal pain and irritation, which could not be controlled by any remedy save the most careful attention to diet, milk being the only thing that the patient could bear. Three weeks after her admission œdema of the right limb commenced, and the condition of the right leg soon became the same as that of the other. It was evident that there was obstruction of the left femoral and iliac veins, and that it had extended up to and involved the common iliac vein on the right side. Clinically the case was an extremely easy one to read so far as the local changes went, and before the swelling of the right limb occurred it was prognosticated that it would occur. The femoral vein could be felt hard and distended on the left side,

and when the œdema on the right side occurred the vein on the opposite side was as firm and hard under the finger as a cord. After this, without any material change in the general system, collateral circulation of the venous system of the abdomen began to establish itself, with a reversal of the blood currents, these being directed towards the thorax instead of the groin. There was then some slight clearing up of œdema, and just a prospect of recovery. Still the gastro-intestinal irritation remained—and then suddenly there came an accession of symptoms, indicating uræmic poisoning. Then there was rapidly developed extreme œdema of the whole body, which pitted easily; and finally, with uræmic phenomena, death took place. I will now show what we guessed at as the cause of the disease, but could not distinguish with certainty. There were two great cylindrical patches, close to each other, in the lower portion of the small intestine, of tubercular ulceration of the intestine, with a great series of enlarged glands infiltrated with tubercular matter occupying the mesentery. There was no tuberculosis of the lung; but the gastro-intestinal phenomena appeared to be produced entirely by the condition of the small intestine. The femoral and iliac veins and tributaries were occluded. The vena cava inferior was a complete fibrous cord, shrunken and flattened out. When it was traced up between the kidneys there was found a great firm thrombus, which had already undergone calcification. Then came the most interesting point in the case. On the surface of that calcified thrombus, and projecting up the occluded vein, with its base between the veins of the kidneys, was a fresh newly formed thrombus superadded upon it. From this thrombi had extended into the renal veins, which were completely occluded in their paths towards the kidneys; and the greater number of the small branches in the substance of the kidneys were also absolutely and entirely occluded. By the second deposit of coagulum on the basis of the old thrombus, and its recent extension into both the renal veins, the fatal issue was brought about, accompanied by the uræmic phenomena and ultimately suppression of the urinary secretion, and the rapid development of general anasara, which last was absent in the earlier stages of the case.

CASE OF DYSENTERY, FOLLOWED BY GANGRENE OF THE FOOT.

By WALTER G. SMITH, M.D.;
Physician to Sir Patrick Dun's Hospital;
King's Professor of Materia Medica, Trinity College.

[Read in the Section of Pathology, December 2, 1887.]

Mary L., aged nineteen years, married eight months, was admitted, September 2nd, 1887, suffering from profuse diarrhœa, accompanied by hæmorrhage. Her illness commenced on August 27th, and was ascribed to eating some fish which was not quite fresh.

She was almost in a state of collapse when admitted; eyes sunken, countenance dusky, pulse 132, and extremely feeble; T. 99·5. The stools were very frequent, about three times in an hour, and the motions were deeply stained with blood. A hypodermic dose of morphine was administered, and she received several astringent and sedative enemata. During the evening, her left leg suddenly became cold, and sensation was lost below a level about three inches beneath the knee. The diarrhœa proved uncontrollable, and she remained for several days in a condition of extreme prostration, the T. never rising so high as 101°. Urine contained albumen. On Sept. 5th, she complained of pain and tenderness in the left popliteal space, and the toes were observed to be affected with gangrene. The necrosis spread, and soon involved all the toes and the anterior half of the foot. She died suddenly on the morning of the 9th, after some attempt at rallying the day before her death.

Post-mortem.—Posterior wall of uterus congested. Mesenteric glands enlarged. Slight perisplenitis. Kidneys appeared normal on section; right weighed 4 oz.; left, 5 oz.

Intestines, when slit open, showed nothing abnormal up to the

commencement of the ileum, where a hæmorrhagic Peyer's patch was seen. Ileo-cæcal valve normal. In the cæcum and ascending colon there were numerous follicular ulcers, with raised edges, and scattered hæmorrhagic spots. The mucous membrane was slate-coloured and mottled with shreds of grey false membrane. In some places the mucous membrane was of a rose colour, and projected in round tuberous masses. Much the same appearances were exhibited in the transverse and descending colon, viz., diffuse necrosis with greenish sloughs of diphtheritic exudation. The interior of the rectum presented a worm-eaten appearance, coupled with turgid œdematous folds of mucous membrane, which had been felt during life, when the rectum was digitally examined.

The left common iliac and external iliac arteries were smaller than their fellows, but nothing was found in the femoral, popliteal, posterior tibial, or peroneal arteries to account for the gangrene of the foot.

The thoracic viscera were healthy.

DYSENTERIC ULCERS IN THE RECTUM WITH GANGRENOUS ULCERS OF THE STOMACH.

By JAMES LITTLE, M.D.;
President of the King and Queen's College of Physicians in Ireland;
Physician to the Adelaide Hospital.

[Read in the Section of Pathology, December 2, 1887.]

In the middle of last October a man, forty-five years of age, sought admission into the Adelaide Hospital, suffering from severe abdominal pain. It was ascertained from independent sources that he had been of very intemperate habits. He said he had had a cough for many months, and a physical examination showed that he was suffering from phthisis, but not in an advanced stage. In the summer an abscess had formed near the rectum, in consequence of which he was for four or five weeks in the Richmond Asylum, and he left it with a fistulous orifice discharging near the rectum. He remained at home for several weeks in broken down health, and suffering from irritation at the lower end of the rectum. Seven days before he came into the hospital he was, while sitting at the fire, seized with severe pain in the right side of the abdomen, apparently in the direction of the hepatic flexure of the colon. He remained at home suffering from the pain, and from that time until his admission to hospital his bowels only acted once. At the time of admission he complained of pain in the epigastrium, which was swollen and so exquisitely tender that he was unwilling to be examined. After some days the severe pain subsided, but his bowels, which during the first few days that he was in hospital had remained confined, became, without anything having been done to cause such a change, very loose, and the looseness continued from that time until his death. On account of the great discharge of purulent matter there was difficulty in examining his

stools. He was very unwilling to be moved or disturbed, and I did not see any stools that had a dysenteric character. He died a fortnight after his admission. A *post mortem* was made by Dr. Bewley, who found small cavities in the lungs. The liver was very large, and had the appearance seen in persons who have died of acute fever. The under-surface of the left lobe of the liver was adherent to the anterior wall of the stomach, and it suddenly gave way and a quantity of purulent matter escaped. A large sloughy-looking ulcer was found in the anterior wall of the stomach, the roof of which was formed by the lower portion of the left lobe of the liver. There was also a small ulcer in the stomach. The sloughy-looking mass connected with the large ulcer was like the surface of a large anthrax, and it communicated with the stomach by an orifice which can be seen in the specimen. The stomach ulcer was not a chronic one, for there was no thickening of the edges, and the surface of the ulcer was covered with gangrenous-looking material. The cæcum was found to be rather extensively ulcerated. It contained several ulcers, but they were rather superficial. In the transverse and descending colons and at the sigmoid flexure ulcers were also numerous. The maximum amount of change was in the rectum and in the cæcum. The question was, had the man suffered from dysentery, and were the ulcers, and other conditions of the stomach, the result of superficial abscesses of the liver opening into the stomach. It was evident that something must have suddenly happened at the time he was seized with the pain, and no doubt at that time the mischief in the liver and stomach first began.[a]

[a] It was subsequently ascertained that this patient had been for some weeks during the Summer an inmate of the Richmond Asylum, where dysentery prevailed.

DYSENTERY: CASES OBSERVED IN RICHMOND (DUBLIN DISTRICT) ASYLUM.

By CONOLLY NORMAN, F.R.C.S.;
Medical Superintendent.

[Read in the Section of Pathology, December 2, 1887.]

Dysentery, till comparatively recent years, has always been a relatively prevalent disease in Ireland. Cheyne quotes Boate, who tells us that this affection "doth greatly reign in Ireland, as well among those of the country as among strangers, wherefore the English inhabitants have given it the name of the country disease." He further mentions Sydenham's term, "endemic dysentery of Ireland," and refers to the havoc wrought by this disease during the wars that devastated the country throughout the greater part of the 17th century. He has not referred to the interesting testimony of the Parliamentary General, Ludlow, who succeeded Col. Michael Jones in his command in Ireland when that officer succumbed to "the flux." Ludlow tells how the flux and "the plague" (apparently a malignant form of intermittent) prevailed in both armies. "Many of ours," he says, "were so distempered with the flux, that they were forced to fight with their breeches down." The mortality in those terrible times was very great. Throughout the eighteenth century the flux, or, as it was more commonly called, "the looseness" continued to prevail. Coming to more recent days, we find from Cheyne's account that dysentery was very frequent in army hospitals and barracks in Ireland some twenty years before the date of his paper (1822). Cheyne has given an admirable account of the epidemic which he treated in the Whitworth Hospital, Dublin, in the year 1818. Dr. Mayne gives the history of an epidemic occurring in Dublin in the years 1846–48, and Dr. Joseph Lalor, my predecessor in the charge of the Dublin

Asylum, wrote a description of an epidemic of dysentery observed by him in Kilkenny in 1846.

In old times asylums were favourite seats of dysentery in other countries as well as in Ireland. This has long ceased to be the case. It is by a mere coincidence that perhaps the best account extant of the disease, as appearing in northern latitudes, is the Report upon the epidemic of dysentery in the Carlisle Asylum in the year 1864 by Dr. Clouston, now so well known as the Superintendent of the Royal Edinburgh Asylum, and the leader of his specialty in Scotland.

The Richmond District Asylum, Dublin, which for several years has received only patients from five counties, was originally used for the reception of lunatic poor from all parts of Ireland. It was opened in the year 1814.

I find by reference to the oldest existing records of the institution that deaths from dysentery took place in the year 1817. The old registers are so very imperfect that their negative evidence is not trustworthy, and in the absence of any medical records worthy of the name we are left to conjecture that this affection may have been less prevalent in the earlier history of the asylum than it has been of late years. At any rate, there is no evidence to show that it attracted any special attention.

Dysentery was at that period very common in the country, and very destructive in public institutions. In 1818, the year of the epidemic which Cheyne dealt with in the adjacent Whitworth Hospital, but two deaths from dysentery are recorded in the Richmond Asylum. Similarly the mortality from this cause may have been low in 1846, 1847, and 1848. In the two latter years only five deaths from this cause were placed on record; while Mayne, for the three years named, treated in the South Dublin Union Workhouse 1,222 cases, out of which 947 arose in the workhouse, and he had 393 deaths. So that, on the whole, the record of the asylum, such as it is, is not unfavourable in this respect for that period. During the years from 1850 to 1860 dysentery is not generally assigned as the cause of more than one death per annum. In the year 1863 Dr. Lalor instituted the

excellent custom, which should be adopted in every asylum, of giving, in his published annual Report, a table showing the diseases and the number of cases treated in hospital each year. In every year save two from that period this table has been published. It shows considerable variation in the number of cases of dysentery recorded from year to year. The numbers for a time were low. None is recorded in 1871, but one in 1872, none in 1873, and none in 1877. From the last-mentioned date the numbers have been commonly high, and the number of cases of diarrhœa, always apparently unduly prevalent in this asylum, has been enormous. The increase in diseases of this class of recent years has been noticed in the text of his published reports by my able predecessor.

That the disease, so-called, was true dysentery Dr. Lalor's special experience in this affection may be taken to prove. A specimen which I shall exhibit to-day, taken from a patient who died in 1881, and for which I am indebted to my colleague and senior assistant, Dr. W. Z. Myles, will show that the lesions observed some years ago are identical with those which are found at present.

On the other hand, it seems to me to be open to doubt, considering the singular prevalence of diarrhœa and the very unusual mortality which I find recorded for that affection, and bearing in mind that unfortunately until within the last year and a half *post mortem* verification of diagnosis was very rarely attempted, whether some cases of true dysentery may not have been recorded under the name of diarrhœa.

Shortly after I took charge of the Richmond Asylum in September, 1886, dysentery of a severe type broke out among the patients. It has existed to a greater or less extent ever since, and in September, 1887, it suddenly and greatly increased, appearing in a very severe form.

Now it is to be observed that in the City of Dublin, within which the Asylum is situated, several cases of dysentery were observed, both in general practice and in hospitals, in the autumn of 1886 and the winter of 1886–1887, while I understand this disease had assumed something approaching to the character of an epidemic in Dublin in the autumn of 1887.

During the sixteen months from September, 1886, to December, 1887, the average daily number of patients resident in the Asylum has been 1,130, the number of the staff (servants, officers, families of the latter, &c.) has been about 145. Total average number of inmates—say, 1,275. During the same time there have been under treatment 147 cases of dysentery. Out of this number there were 25 deaths; 24 died in the institution. One female patient, who was removed by her friends when moribund, died within 48 hours of her discharge.

I regret to say *post mortem* examinations were only possible in ten cases. The following are the notes of the appearances found, with brief outline histories of the previous illness:—

Case I.—A. B., male, aged forty-one, admitted to Asylum May, 1886. This patient suffered from epileptoid seizures, together with white atrophy of the optic discs, due, as was found *post mortem*, to a tumour at the apex of the right temporo sphenoidal lobe. To save time I shall not enter upon a description of this or any other morbid condition found in the nerve centres in any of these cases as there was nothing found which bore in any way I am aware of upon the subject of this paper. On the night of September 15, 1886, the patient complained of pain in the abdomen, and stated that his bowels had not been opened for two days. He was given a simple purgative next morning.

On September 17 he complained of extreme diarrhœa. This was attributed to the too violent action of the purgative. Ordered chlorodyne draught and rest in bed. September 18—Morning temperature, 101°; dry skin; dry, foul tongue. Frequent motions, small in quantity, containing mucus and blood. Much tenesmus. From this date he sank. The temperature never again rose above normal. The bowel symptoms remained unaffected by treatment. Hiccough set in on the morning of September 20, and could not be restrained. He died on September 22.

Autopsy, 24 hours after death.—Body well nourished, well developed, and fat. Heart normal. Left lung normal; right much bound down by old pleural adhesions; lower lobe in a state of red hepatization. Liver large, somewhat pale, mottled on section, presenting well-marked "nutmeg" appearance. Spleen large; decomposed. Intestinal canal healthy as far as the ileo-

cæcal valve. The internal surface of the cæcum was intensely and pretty uniformly congested. The ascending colon presented numerous patches of arborescent injection set in pinkish tracts of mucous membrane; the transverse colon showed not only much congestion similar to that in the ascending colon, but also numerous, generally roughly circular or stellate patches of ulceration. Lying in these ulcers, usually detached to a greater or less degree at the margins, was a thin soft substance of a tough consistence and dirty grey colour. The last few inches of the transverse and the entire of the descending colon and rectum presented a close succession of raised ridges, running irregularly in a direction at right angles to the long axis of the intestine, the summits having a soft swollen appearance, and being of inky blackness. In this portion of the gut the lumen was diminished, and the entire intestinal wall much thickened.

Case II.—D. L., male, aged sixty-eight, admitted to the Asylum May 6, 1885, suffering from secondary derangement. He presented signs of aortic valve disease. He had been in India many years ago, and had suffered from dysentery while there. During his stay in the Asylum he had frequently been under treatment for bowel trouble, which, at least once before, had assumed a dysenteric character. He was admitted to the Asylum Infirmary September 15, 1886, suffering from dysenteric symptoms, *i.e.*, frequent small motions, containing blood. mucus, and shreds (substances looking like small particles of lymph). His tongue was dry and deeply furrowed. Temperature normal. Treatment seemed to have no effect upon his symptoms. After about two weeks he began to pass small quantities of pure blood. He died October 20, 1886.

Autopsy, 17 hours after death.—Body well developed; thin. Abdomen of a greenish colour in the flanks and over the course of the colon. Marked hypostatic congestion of both lungs, particularly the right. Some engorgement of the bronchi. The larger tubes in the lower lobes of both lungs exuded a muco-purulent fluid when cut. Heart large. Left ventricular wall very thick. Aortic valves small, hard, puckered, containing here and there cartilaginous plates and nodules, their bases forming a continuous ring of almost bony hardness. Mitral valves healthy. Right side of heart healthy. Patches of atheroma in aorta. Liver weighed 56 ounces; friable, mottled ("nutmeg"). Patches of deep red here and there, pretty sharply demarcated. In substance of right lobe,

close to gall bladder, a small cyst, containing clear fluid. Gall bladder packed with facetted gall stones—forty in number, some black, some yellow. Ductus choledocus communis contained two stones; it was widely distended, but not occluded. Kidneys small, granular.

The entire of the large intestine was externally deeply congested, and of a purplish colour. There were no perforations, but the gut gave way in two or three places on removal. At these spots there were ulcers with raised edges, which appeared to have penetrated so deeply that their bases were scarcely thicker than tissue paper. The entire large intestine was dilated, and the wall enormously thickened. The lower portion—rectum and descending colon—presented an almost continuous condition of ulceration, a ragged surface, covered with pus and debris. Numerous irregular ridges existed. Their surface was in the same state as the intervening tissue. In the transverse and ascending colon, black ridges alternated with tracts of ulceration serpiginous in outline, with here and there a large circular ulcer with raised edges. Some of the black ridges presented small patches of loss of surface. On scraping away the black substance around them, it was seen that these patches of ulceration penetrated deeply into the thickened submucous coat. Cæcum thickened and ulcerated. Surface irregular, rough, covered with pus and debris. A similar condition existed in the lower 5 or 6 inches of the ileum; higher up a number of rounded ulcers, not occupying the position of Peyer's patches, varying in size from a shilling to a threepenny-piece, with a few black ridges; higher still, patches of intense congestion. Above the last three feet of the ileum only occasional patches of arborescent injection. These existed also here and there throughout the jejunum. Stomach and duodenum healthy.

Case III.—B. T., male, aged fifty, admitted to Asylum May 2, 1867. A chronic dement, feeble in general health, and somewhat dirty in habits. He was first observed to suffer from dysentery on November 7, 1886, but owing to his dirty habits it is quite possible that the disease may have existed for some time, and been overlooked. He could give no account of himself. The motions for the first two days contained a good deal of fæcal matter in the form of scybala. Temperature was taken frequently, but not, I regret to say, regularly, the patient being very restless and unmanageable. It never was found to be more than $\frac{1}{2}^{\circ}$ above normal. He lost

strength very rapidly, and died on November 12, 1886, hiccough having appeared about ten hours before death.

Autopsy, 17½ hours after death.—Body emaciated; rigor mortis well marked; greenish discoloration of the abdominal wall all over the track of the colon. Anus patulous. A little of what appeared to be pure blood exuded when the body was moved. Thorax, old pleural adhesions; slight hypostatic congestion of both lungs. Heart, valves healthy; left ventricular wall considerably thickened; substance firm. Liver weighed 53 ozs. "Belt groove" on right lobe. In the right lobe, at a point about the centre of the surface of the liver, and about the thickest portion of the viscus, a cavity was found about the size of a walnut, containing about 4 drachms of pus, surrounded by what seemed to be a broken-down capsule, which again was surrounded by a zone of considerably darkened, but not apparently softened tissue. This cavity lay near the surface, only about a quarter of an inch of liver tissue separating the abscess wall from the peritoneal covering. Below and to the right, immediately beneath the belt groove, was a second cavity, the size of a tangerine orange, containing about two ounces of pus. This abscess was evident before section as a slight but distinct elevation on the surface of the liver. On palpation over the elevation, fluctuation was distinct. The tissue existing between the abscess and the surface of the liver was in parts not more than a line in thickness. In the left lobe, near its right margin, there was an abscess nearly as large as the last, but much more central, being about 1½ inches from the surface. Besides these there existed in the right lobe two abscesses, about the size of a marble, one close to the anterior surface and right margin, the other in the upper part of the lobe, not far from the posterior surface. There was an abscess of the same size in the left lobe, close to the free anterior margin. These three smaller abscesses seemed to have a somewhat more distinct wall than the larger ones. They contained thick pus, very slightly tinged with green. The larger cavities contained pus, partly thick and partly thin, of a greenish yellow colour. Each abscess was surrounded by a congestive zone. Each abscess appeared perfectly separate and distinct from any other; the congestive zones never ran into each other. There was no manifest connection with the larger venous trunks, which seemed perfectly healthy, as did the vena portæ. Kidneys weighed each 5 ozs. In both the capsule was in parts adherent; otherwise the naked eye appearances were normal.

Intestinal Canal.—Stomach healthy; small intestines normal as far as about the middle of jejunum, where there was a patch of uniform deep reddish discoloration, about 2 inches long, extending round the gut. From this point downwards, small portions here and there exhibited an arborescent injection. No other morbid appearance was found above the ileo-cæcal valve. The whole of the large intestine was dilated, and the wall immensely thickened, the thickening being apparently greatest in the submucous coat. Externally the gut was of a mottled purplish colour. Internally the mucous membrane was thrown up into immense ridges varying in colour, some grey, some greyish black, and some of a deep purple. The latter prevailed, especially in the rectum. These ridges ran very irregularly, but had a general tendency to run in a direction at right angles to the long axis of the gut. Most of the ridges were ulcerated on the top, the ulcers taking an oval or roughly circular form, greatest diameter corresponding to the direction of the ridge. In many places these ulcers appeared to have demolished the ridges, and to have got to the level of whatever normal tissues remained in the intestine. The whole appearance of the gut recalled to one's mind a raised map of a mountainous country (Heubner). Mesenteric glands of large intestine enlarged; deep plum colour.

Case IV.—A. D. M., age forty-one, female. Admitted to the Asylum, August 25th, 1886, but had been under treatment some years before. Her mental condition was one of advanced secondary dementia. Her general health was feeble and shaky, without any definite signs of disease. She was very dirty in her habits. Signs of dysentery were observed for the first time on September 20th, 1886. There was great debility and rapidly increasing prostration. After the first twenty-four hours the motions seemed to pass away quite involuntarily. The flux was almost continuous. Death occurred on September 23rd, seventy-nine hours after the first symptoms were observed.

Autopsy, 22 hours after death.—Heart healthy. Lungs showed slight hypostatic congestion. Liver, kidneys, and spleen normal to naked eye appearance. Stomach and small intestine healthy. The upper portion of the large intestine showed occasional patches of congestion and aborescent injection. About the middle of the transverse colon, black and greyish-black patches of rough soft tissue began to appear, which became more numerous as

the gut descended. Very considerable thickening of the descending colon and rectum, which were rough and eroded. The prominent portions varied in colour from slate grey to purplish black. Numerous large black ridges in rectum. Mesenteric glands of large intestine enlarged; claret coloured.

CASE V.—T. B., aged sixty-five, female. Admitted to Asylum, July 13th, 1869. Suffered from secondary dementia. For some years past she had been in feeble health, though no definite signs of organic disease were discovered. On November 6th, 1886, she presented symptoms of dysentery. She was then found to be suffering from œdema of the feet and ankles and slight ascitic effusion. She sank rapidly. After the first two or three days she had involuntary motions. Died November 15th, 1886.

Post mortem examination 9 hours after death.—Considerable degree of general anasarca. Abdominal cavity contained about four pints of fluid free from lymph, of the ordinary ascitic character.

Thorax.—Pericardium contained about four ounces of clear fluid; heart's valves healthy; muscular substance thin, especially in left ventricle; weight, 12 ounces. Patches of atheroma in the ascending aorta. Left pleura adherent in parts; contained about 4 ounces of clear fluid. Right pleura without adhesion or signs of recent inflammation. Cavity contained about 10 ozs. of clear fluid. Left lung contained a nodule of cheesy tubercle about the size of a pea. Right lung contained one similar nodule, two calcareous nodules each about the size of a pea, and one nodule containing cheesy matter, and surrounded by a capsule of cartilaginous hardness. Lower portion of middle lobe of right lung airless, and of a deep plum colour. Lower lobe contained little or no air, and uniformly of a bluish purple colour.

Abdomen.—Liver, 45 ozs. Left lobe singularly elongated and thin, lying over a portion of the spleen. From extreme right to extreme left margin measured over 12 inches. Substance flabby and friable, of a nutmeg appearance. Kidneys granular. Spleen weighed 3 ozs.; normal in consistence and in naked eye appearances.

Intestinal Canal.—Stomach small, perfectly healthy; duodenum and jejunum healthy. In upper part of ileum a few points of arborescent injection; lower down, general congestion. About two feet from the ileo-colic valve, the lumen of the gut was narrowed,

owing to an old firm cicatrix on the anterior wall. A similar cicatrix existed about one inch above the valve. The entire of the wall of the large intestine was greatly thickened, the thickening generally increasing as the gut descended. The gut seemed soft, and tore readily in removal, when two or three ulcerated spots gave way. No *ante mortem* perforation. Ulcers of various sizes, with more or less definite margins, in the ascending and transverse colon; in the descending colon and rectum irregular black ridges of a soft pulpy appearance. Where these did not lie in close juxta-position, or where one gently separated them, the intervening tissue seemed to be destitute of mucous membrane, and was of a dirty whitish colour, with faint indications of striæ running at right angles to long axis of gut. Externally, large intestine of a deep purplish colour, in parts almost black. Mesenteric glands of large intestine and retro-peritoneal glands enlarged, deep purple.

Case VI.—E. P., aged forty-seven, female. Admitted to Asylum, May 28th, 1885. Chronic mania with epilepsy. Admitted to hospital suffering from dysentery, July 17th, 1887. The temperature on morning of July 17th was 100°, in the evening 100·2°. From that time it ran steadily down to 97° on the evening of July 19th. There were physical signs of bronchitis. There was marked pain in the iliac regions, especially left. The motions are noted as having contained the so-called "raw beef" lumps, and having a sickly smell, like blood. Hiccough appeared early, and was uninfluenced by treatment. Died 2 a.m, July 20th, 1887.

Post mortem examination, 14 hours after death.—Heart healthy. Lungs healthy, save for slight hypostatic congestion, and injection of the mucous membrane of the larger bronchi.

Abdomen.—Liver—weight 41½ ozs.; friable, mottled yellow and brown "nutmeg." On surface of left lobe in one or two places the surface presented a reticulated or coarsely granular appearance. Kidneys—capsules adherent in part; generally pale, particularly cortex. Cyst about the size of a marble on most convex portion of left kidney, just beneath the capsule.

Intestinal Canal.—Stomach healthy; duodenum healthy; jejunum and ileum presented here and there patches of arborescent injection, otherwise healthy. Internal surface of rectum thickly covered with prominent ridges, quite irregular in shape, covered with a dirty slate-coloured deposit, which could not be scraped off without using a good deal of force. Cutting into these ridges, it was seen that the

grey matter rested upon elevations of mucous membrane, which showed a superficial zone of intense injection. Several irregular elevations not covered with greyish matter, but of a deep plum colour. A few shallow ulcers, surrounded by zones of intense injection. Throughout the entire colon there were numerous ulcers; some presented little signs of inflammation, but most were surrounded by zones of intense injection. The ulcers generally took a circular or oval form, the long diameter of the oval running at right angles to the long axis of the gut. Besides the ulcers, which were surrounded by raised edges, there were numerous patches of shallow erosion. The same grey substance above alluded to was found on many of the ulcers, and filling portions of the eroded patches, and existing between the eroded patches. The ulceration and deposit extended exactly to the ileo-colic valve, on the colic margin of which a patch existed. Mesenteric glands of large intestine enlarged, of an intense plum-colour. When specimens were preserved in spirit minute holes, like pin-holes, were found here and there throughout, which were conjectured to be caused by the dropping out of the solitary glands.

Specimens in this case were submitted for microscopic examination to Professor Purser.

Case VII.—R. S., aged fifty-six, female. Admitted to asylum, May 28, 1887. A fretful and feeble melancholiac. Dysentery appeared July 20, 1887; precordial anxiety and sighing respiration from the first; pain and great tenderness in iliac regions, especially left. Temperature rather irregular, tendency to evening exacerbation; highest, July 20, 101·5°. From August 10 never rose higher than normal, and often fell below 98°. From morning of August 17 it never reached 98°. Early in the case the motions were passed involuntarily. For 24 hours before death there was no motion from the bowels, and the patient appeared to be collapsed. Died at 6 p.m., August 20.

Post-mortem examination 22 hours after death.—Fairly nourished; thick layer of abdominal fat; rigor mortis well marked; small bedsores over sacrum and nates.

In this case the abdominal cavity alone was opened. Liver fairly firm, about normal size, mottled nutmeg; intestines in normal position; no sign whatever of general peritonitis. Careful examination of the intestines *in situ* showed a considerable amount of con-

gestive discolouration of the large intestine, but the peritoneal covering throughout presented the normal glistening appearance. At the lower part of the descending colon, just above the sigmoid flexure, two small openings existed in the gut, the larger being somewhat larger than a three-penny piece, the smaller about half this size. The edges were perfectly rounded, the openings were patulous, no fæcal matter lay around them. The stomach, duodenum. and jejunum were normal. Throughout the ileum, especially on the lower portion, there were numerous patches of bright injection. About an inch above the ileo-colic valve, and in the position of a Peyer's patch, an oval ulcer existed about three-quarters of an inch wide at its widest part, and about two inches in long diameter, with a greenish black surface. When the large intestine was opened it was found to contain here and there small quantities of a dark red grumous material. The whole of the interior of the large intestine presented various conditions of ulceration. Here and there were more or less definite ulcers, with raised edges, some quite clean cut, but throughout the greater parts of the intestine sinuous and irregular ulceration appeared to have destroyed almost the entire mucous surface. What seemed to be the remaining portion of mucous membrane was cast into high swollen ridges of a greenish black colour. In the sigmoid flexure and upper part of rectum, which were enormously thickened, the denuded portion and the blackened portion took the form of three furrows and three ridges, running in the direction of the long axis of the gut, and recalling the appearance of a ploughed field.

Case VIII.—B. E., female, aged thirty-four. Admitted to Asylum, January 29, 1880. A chronic dement. Dysenteric symptoms were first observed on September 5, 1887. Temperature on the evening of that day, 102·5°; it fell next day, and kept subnormal (98°) till the evening of September 17, when it rose to 100°. There was from the beginning considerable hæmorrhage from the bowels, small quantities of pure blood being frequently passed. Hiccough was also an early, continuous, and distressing symptom. Died, September 18.

Post-mortem examination (for notes of which, being absent from home at the time, I am indebted to my assistant, Dr. G. P. Cope), 20 hours after death.—Body emaciated; light yellowish fæces escaped from the anus when the body was moved or abdomen

pressed; tubercular deposit in apex of left lung; liver soft and friable, nutmeg discoloration. The peritoneum contained a quantity of somewhat turbid fluid, with flakes of lymph, and the intestines were a good deal matted together with deposits of lymph; intense injection of peritoneal surface of greater part of large intestine. In the descending colon a small opening into the gut existed. The edges of the opening were rounded, and were not raised nor surrounded by any special inflammatory zone. Internally, the stomach and small intestines, till about one foot from the ileo-cæcal valve, appeared healthy; the last foot of ileum was intensely injected, with here and there patches of greyish deposit; a similar greyish or slate coloured deposit existed pretty uniformly over the inner surface of the large intestine, with here and there patches of erosion which appeared to be caused by the coming away of the deposit. The rectum was thrown into deep purple ridges, with thin, patchy, slate-coloured deposit; ulcers of various shapes and sizes, some with clean punched edges, and some very deep, existed here and there throughout.

Case IX.—T. M., female, aged forty-one. Admitted to Asylum, March 10, 1886; admitted to asylum hospital suffering from dysentery, July 11, 1887. The woman suffered from melancholia of a low type, and was always feeble; she sank gradually. For several weeks before death nothing distinctively dysenteric was observed in the motions, but a considerable degree of diarrhœa continued. From the beginning of the bowel trouble the patient became extremely dirty in her habits, so that it was difficult to be always quite sure of the nature of the stools.

Autopsy, 16½ hours after death.—Extremely emaciated; *rigor mortis* absent in legs, present in a slight degree in arms; no discoloration on posterior surfaces; abdomen shrunken; anus open, slightly ulcerated, exuding thin yellow fæces.

Thorax.—Loose tissue in anterior mediastinum œdematous; heart valves healthy; left ventricular wall very thick and firm; about 2 ozs. clear fluid in the pericardium. A few bands of old adhesion existed between the walls of the right pleura; left free. Both lungs were œdematous, and were slightly congested posteriorly. In the apex of the right there was a solid nodule about the size of a large pea, containing caseous matter. Right lung weighed 20 ozs; left, 18 ozs.

Abdomen.—Spleen extensively adherent to under-surface of left

lobe of liver; soft and pulpy; weight, 3½ ozs. Liver flabby; cut surface showed nutmeg mottling; weight, 37 ozs. Kidneys—right somewhat congested, particularly in the pyramidal portions. Capsule adherent; weight, 4¾ ozs. Left presented on its surface a number of small yellowish bodies, apparently incorporated with the capsule, some solitary, generally corymbose; where solitary about two lines in width, and raised about one line. On section the bases of these papules seemed continuous with the cortex; they contained a caseous-looking substance. On section the pyramidal substance appeared deficient; the calyces were much enlarged, the calycine walls thickened, and the calyces contained a thin, greyish fluid (*query*, urine and pus?) In the portion of the kidney whereupon the above-mentioned papules were found there were several cavities invading apparently only the cortex, and containing thin pus. Stomach large, thin-walled; several small dark points on internal surface as if minute points of extravasation; contents, curdled milk. Pyloric valve so tight that water would hardly pass through it when the stomach was distended, but without any distinct sign of cicatrix; duodenum and jejunum healthy. The entire of the mucous surface of the rectum and lower portion of colon was thrown into numerous unequal ridges of a black colour, running irregularly in a direction at right angles to the long axis of the gut. These ridges could not be scraped off without cutting away the substance; they varied in height and length, but in the rectum and sigmoid flexure they completely concealed the other portions of the surface of the gut. Between the ridges the gut presented a rough, eroded appearance. The ridges became less frequent as the gut ascended, but they existed in greater or less numbers throughout the whole large intestine and on the ileo-cæcal valve itself. In the upper part of the colon were numerous shallow ulcers, some surrounded by a blackened tissue, some with raised edges not black, and others surrounded by a zone of injection. Where the surface was free from black ridges, there were numerous patches of intense injection in aborescent form. One ulcer, situated in the transverse colon about 14 inches from the ileo-cœcal valve, had on its surface a whitish slough. Mostly the ulcers were of a long oval shape, lying at right angles to the long axis of the gut. The lower foot or so of the ileum contained a few black ridges, and some spots of ulceration and erosion; these became fewer as the gut ascended. Further up the ileum presented a few patches of arborescent injection, and then became

normal in appearance. None of the eroded spots corresponded to Peyer's patches, but in the lower part of the ileum the Peyerian patches seemed unduly prominent, and where they did not share the general intense injection they presented an appearance like a shaved beard—*i.e.*, numerous minute dark points set in dull white tissue, which seemed to swell slightly round the dark points.

The mesenteric glands of large intestine and lower part of ileum were somewhat enlarged, and of a deep plum colour. The retro-peritoneal—lumbar and iliac—enlarged, deep purple or black. The mesenteric structures were everywhere œdematous. There was about one quart of clear fluid in the peritoneal cavity.

Case X.—M. E., female, aged sixty-seven Admitted to the Asylum, July 13, 1887. A rather feeble, old, chronic dement. She was found to be suffering from dysentery on September 28, 1887. There was no rise of temperature, no considerable hæmorrhage, and the symptoms were not of a severe type. Her age and general feebleness, of course, lent gravity to the case. About the beginning of November the motions became fæcal, and ceased to show any special dysenteric characteristics; there continued, however, a distinct tendency to diarrhœa. Died, December 6, 1887.

Autopsy, 20 hours after death.—Extremely thin, *rigor mortis* passing off; greenish discolouration over abdomen, which was rather retracted.

Thorax.—Heart, a small rough plate, in part of bony, in part of cartilaginous hardness, lay between the aortic and mitral valves, at the inner side of the latter. Both pleural cavities contained a small quantity of fluid; a few old adhesions on the left side. Both apices presented numerous whitish spots on the pleura, elevated, and about the size of a No. 11 shot. They were hard, and on section seemed to invade the lung tissue. There were also in the substance of the apices, especially the right, many hard dark bodies up to the size of a No. 6 shot. A number of minute pearly white spots on the portion of pleura dividing the clefts between the lobes. There was no trace of inflammatory action excited by these deposits either in lung or pleura. Slight hypostatic congestion; emphysema of anterior borders.

Abdomen.—Liver, kidneys, and spleen apparently healthy; stomach very large and flaccid, walls uniformly rather thin. Here and there fairly-marked large spots of arborescent injection; also a few purplish spots, which were seen to be made up of minute vessels

gorged with blood. Two small extravasations into the mucous membrane had occurred—one a mere streak, the other the size of a pin-head. Contents of the stomach, milk-curds. Small intestine healthy, save for a slight undue redness at the lower end of the ileum; no ulceration. Large intestine—little or no discolouration visible in the unopened gut; mesenteric glands of large intestine enlarged, claret-coloured; retro-peritoneal glands normal. When the large intestine remained *in situ* the transverse colon, which was distended with flatus, instead of running transversely across the abdomen lay in a V-shaped bend. The gut turned pretty sharply just beyond the hepatic flexure, and ran downwards, the apex of the V reaching almost to the symphysis pubis in the middle line; it then turned up again, and resumed the normal position just above the splenic flexure. The wall of the ascending, transverse, and upper part of descending colon was generally thin and flaccid, but there was a band about 2½ inches long on the tranverse colon (ascending limb of V) near the splenic flexure where the gut was thickened, the internal surface puckered, and the lumen diminished. The wall of the descending colon and rectum was thickened, and the lumen of the gut notably diminished. Internally the rectum was of a pretty uniform greyish colour, mottled with pink; in the descending colon the pink predominated, and the grey passed into a marbling of greyish-black irregular patches that seemed thicker than the rest of the intestine. Numerous small patches of thin, ashy-grey membrane, with ragged edges, lay on the grey portions and on the surface of the blackish patches. This thin membrane could not be scraped away without leaving superficial erosions. A few superficial erosions existed, probably caused by the separation of this substance. Coming to the upper part of the descending colon there was found a pretty extensive patch of superficial erosion, deepening in parts so as to form distinct pits; also two or three roundish ulcers, without raised edges, with ashy-grey bases. Here, too, there were several patches and ridges, not much elevated, of a deep claret colour; they were quite irregular in their course, some slightly eroded on the summit. Above the splenic flexure these dark raised patches were less numerous and marked; here were several shallow ulcers, of irregular contour, containing greyish sloughs. The greater part of the transverse colon presented here and there minute shallow erosions, tending to a circular shape. The first part of transverse colon was mottled with patches of deep red, amongst which occurred numerous superficial erosions

of various sizes, tending to a greyish colour, and having a granular appearance. Upper part of ascending colon was of a bright red colour, with irregular raised patches of deep red. Among these lay many irregularly stellate patches of ulceration, with exceedingly jagged edges, usually surrounded by a deep red, raised, and rather overhanging border, having had a singular puckered appearance. The surface of the larger ulcers looked as if it had shrunk away from the border, was greyish-black or black in colour, and had an uneven, rough appearance. A few erosions and small shallow ulcers, with little discolouration, in the remainder of ascending colon and cæcum.[a]

To sum up:—in all these cases there was present a condition of the mucous membrane of the large intestine, of which the special naked eye characteristic was the appearance of large, soft, black, or very dark purple ridges. This was accompanied by general thickening of all the intestinal coats. It is evident that this condition existed prior to ulceration, and was really the essential feature of the disease. The extent to which ulceration of the large intestine occurred varied. In one very recent case—No. IV.—it merely existed in the form of slight erosion. The various forms of ulceration seem to be due to the extent to which death of the infiltrated tissue has taken place. The morbid appearances were almost always most distinct in the rectum and lower part of colon, and the probability seems strong that they began there. In Case No. X., on the other hand, in which I take it the gut was undergoing a process of cure, the lower part of the intestine, which evidently had been profoundly engaged, was nearer to its natural

[a] The specimen of large intestine, taken from a patient who died in 1881, above referred to, exhibited appearances identical with those exhibited in my cases—namely, large rugæ, patchy denudation of epithelium, some circular punched-out ulcers, and some ulcers with puckered edges and firmly-adherent, granular-looking sloughs. At the same meeting at which this paper was read, Dr. Little, of the Adelaide Hospital, described a case of dysentery (see p. 312). It is worthy of note that Dr. Little's patient had been a patient in my Asylum from November 3, 1886, till September 1, 1887, when he was discharged recovered mentally, but suffering from phthisis and from an anal fistula that had been opened but remained unhealed. For the latter affection he was admitted to the Adelaide Hospital on October 15, 1887, and died of dysentery there October 30, 1887.

condition than the upper part—a fact which tends to confirm the notion that the disease begins below.

Perforation occurred in two cases, in both in the descending colon.

The small intestines were engaged in six cases. In one (No. IX.) black ridges existed quite similar to those in the large intestine. In two cases (Nos. II. and IX.) ulceration existed, unconnected with Peyer's patches. In four cases (Nos. III., V., X., and VII.), various states of congestion and swelling, short of the formation of dark ridges, existed. In one case (No. VII.) a Peyerian patch was ulcerated; in another (No. IX.) Peyer's patches presented the appearance described as "the shaved beard."

From my examinations I failed to find any evidence whatever to suggest that the solitary glands were specially or primarily engaged.

In four cases tubercle was found in the lungs, and in one of these also in the kidney. Seven out of the entire ten cases presented nutmeg discolouration of the liver. As far as I can learn, this condition has not heretofore been noted as occurring with special frequency in dysentery. In one case multiple abscesses of the liver existed.

With reference to the occurrence of hepatic abscess with dysentery, it is well known that the combination is comparatively rare in cold climates. It was rare, according to Aitken, in the severe dysentery that visited our troops in the Crimea. Its frequency in India need not be dwelt upon (60 per cent. in Madras—Maclean).* Baly has pointed to its relative infrequency in China; it is said to be common in Algiers. Heubner contrasts the single abscess which occurs in tropical dysentery with the multiple abscesses that follow dysentery in Europe, which are, he says, of embolic source, and are found in connection with periproctic inflammation. Maclean, on the other hand, states that hepatic abscesses, accompanying tropical dysentery, are rarely single. In the case which I have just described there was no periproctic inflammation, and in a case which I had an opportunity of seeing some years ago, of a lunatic who died of tubercular inflammation of the lower portion of the rectum with

* This proportion evidently refers to the "pre-sanitary days."

fistula, and extensive burrowing and sloughing about the anus, a single abscess was found in the liver.

Cheyne has reported, I think, five cases of abscess among thirty autopsies. In one there were two abscesses, "one large and full of purulent matter;" in another two abscesses, one of which had been evacuated *ante-mortem* through the abdominal wall.

In a third case the liver was "large and full of abscesses, containing yellow pus." In a fourth there was "a very extensive abscess of the liver, which contained nearly six pints of whey-like matter, mixed with flakes of lymph; large masses of which were connected with the walls of the abscess." This description precisely corresponds to the appearances found in the case of tubercular ulceration with periproctitis which I have above alluded to.

The *post mortem* appearance in another case Cheyne thus described: "Colon adherent to liver; a circumscribed tumour, containing cheesy matter, in the surface of the right lobe." This was probably an abscess, the contents of which had undergone caseous degeneration. In all the cases the disease had been of many weeks duration, and in all, save the fourth, "extensive sloughing of the mucous membrane" was described. To his account of dysentery in his own practice Cheyne has appended a report by Dr. Preston on the epidemic of dysentery in the 79th Regiment at Limerick. Among ten *post-mortem* examinations two cases were found in which the liver was studded with abscesses. In some others "the whole structure" was "apparently destroyed"—I know not what this means.

Writing in 1847, Dr. Baly say: "Among many hundreds of cases occurring in the Millbank Prison, not one has been complicated with hepatic abscess." Out of 393 deaths which took place in the South Dublin Union Workhouse, Dr. Mayne has recorded hepatic abscess in but one. This he describes as a case of chronic dysentery complicated with suppurative phlebitis. There were three small abscesses in the right lobe of the liver. There were abscesses also in the right lung.

Dr. Clouston had one case of abscess of the liver in sixteen autopsies on patients dying of dysentery. From his statement one gathers that the abscess was single.

ON THE ETIOLOGY OF DYSENTERY.

(A Supplement to the preceding Communication.)

By CONOLLY NORMAN, F.R.C.S.;

Medical Superintendent of the Richmond (Dublin District) Asylum.

[Read by desire of the Pathological Section at a Meeting held on January 13, 1888.]

On account of the length to which my previous paper on dysentery has already run, as well as for certain other reasons which will presently be obvious, I shall deal briefly with the question of causation. It appears to me that it scarcely needs to be argued at this period in the history of medicine that dysentery is a specific disease, and dependent upon a specific poison. Until science shall have isolated this poison our efforts must be confined to treating of second causes and of circumstances that favour the growth and conveyance of the disease rather than to dealing with the essential cause.

That the poison of dysentery has strong analogies with the poison of so-called malaria is evident, and that dysentery exists most frequently in the countries and at the times when malarial fevers most abound is well known. At the period and in the localities in which intermittent fever was common in England dysentery co-existed. Since intermittent has disappeared dysentery has become a rare affection. The same coincidence befell in Ireland; but dysentery lingered long in this country, and seems to have burst out afresh with unusual virulence at a time when the population was being decimated by typhus and relapsing fevers.

There is reason to believe that dysentery, like other diseases of its class, assumes or simulates now and then a contagious character.

The weight of evidence appears to show that the dysentery poison, however generated, is conveyed in the exhalations arising from earth saturated with decomposing organic products. Taking

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Writing in 1847, Dr. Baly [illegible] *Prison*, [illegible] *of 323 deaths* [illegible] *Dr. Mayne* [illegible] *describes* [illegible] *suppurative phlebitis*. There were [illegible] *right lobe of the liver*. There were [illegible] *of the liver in sixteen* [illegible] *From his statement* [illegible]

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modern and well proved instances:—Latham conceived that the dysentery at Millbank was due to faulty diet of the prisoners and to the influence of imprisonment, and he pointed to the fact that none of the staff suffered. The diet was improved, but the disease got worse, and attacked officers and servants as well as prisoners. The prison was emptied, and it was imagined that dysentery was got rid of; but twenty-two years later, Baly records a repetition of the same state of affairs—dysentery never absent from the institution, and occasionally taking a violent epidemic form. Baly argued, I think most convincingly, that the true cause was connected with a moist subsoil, loaded with the products of organic decomposition. Since the date of Baly's observations, the Millbank Prison has been thoroughly drained, and dysentery no longer appears. Clouston, in that most able paper to which I have referred, proves beyond the possibility of contradiction that the outbreak of dysentery in the Carlisle Asylum was due to the exhalations from sewage spread upon the ground near the asylum buildings. The cause being removed, the disease at once disappeared.

There are two points on which I think I ought to say a few words—one with reference to the reputed influence of insanity in producing dysentery; the other with regard to the question of diet.

Among the older writers on asylum statistics the belief appears to have prevailed that the insane were in some special way liable to dysentery. But although it is quite intelligible that the existence of insanity, accompanied, as it almost always is, by lowering of the general vital power, may render an individual more vulnerable, yet the prevalence of dysentery in asylums, in what Maclean calls the pre-sanitary days, proves nothing. In those days dysentery prevailed also in workhouses, military barracks, and prisons. All these establishments have one feature in common—the crowding together of a large number of people in a comparatively limited space, and all are liable to suffer from sanitary defects in connection with removal of excreta. In a similar way, we can account, at least in part, for the liability to dysentery in besieged cities and in camps. In connection with the latter, the words of Heubner are to be specially noted—"In the last war

(1870), Virchow and Seitz rightly called attention to the fact that the dysentery developed into an epidemic chiefly in the camps around Paris and Metz—places that were already known to have been infested with endemic intermittents (*e.g.*, the fortifications round Paris) or dysentery."

One of Dr. Clouston's patients was a sane attendant who contracted dysentery after having been three days in the asylum, and died of it after two months' illness. Two of my cases, a male and a female, were sane attendants. Both of them, as it happened, had the disease in a mild form. It struck me to examine into the mortality from dysentery in English asylums during the year 1886. I have received the reports of forty English asylums for that year, and I find that these institutions present collectively a "daily average number resident" for the year of 32,740. The actual number of deaths was 3,366. Two of the asylums adopt in their mortality table the Registrar-General's heading, "Dysentery and Diarrhœa," without further distinction, and under this heading twelve deaths were recorded. In the reports of the remaining thirty-eight no mention whatever is made of dysentery, and there are but fourteen deaths attributed to diarrhœa. Thus if deaths from dysentery were not absolutely unknown, the proportion they bore to the general death-rate was insignificant.[a]

On the whole, then, we may safely say that the influence of insanity need not be considered etiologically.

Diet.—Believing, as I do, that dysentery is a specific disease, I, of course, do not think that errors of diet could have anything more than a predisposing effect. The diet of the patients in the Richmond Asylum has not been satisfactory in some ways. It is, nevertheless, fairly liberal, compared to other similar institutions in this country. The quantity of fresh flesh meat given is rather

[a] Compare Tyerman's record. He states, writing in 1855, that fifty-six cases of dysentery and sixty eight of diarrhœa had occurred during three years in the male department of the Middlesex Asylum, Colney Hatch (containing about 750 patients). The mortality from dysentery was 1 in 3 of those attacked. He also recalls an interesting epidemic of dysentery which broke out in the Cornwall County Asylum, Bodmin (twenty-seven cases, of which eleven terminated fatally), in the year 1849, at a period when dysentery and Asiatic cholera prevailed in the neighbourhood.

more than that supplied in most Irish district asylums. The diet lacks variety, but that is a common fault in institutions, and, unfortunately, impossible to avoid in this instance. The allowance of fresh vegetables given formerly was low (about 56 oz. per patient per week); but it was about the same as that in use in the Irish local prisons, and neither in these institutions nor in the other Irish asylums is dysentery endemic.[a]

It may not be out of place here to correct a mistake as to the epidemic of dysentery at Carlisle Asylum, which has been made by Maclean, Aitken, and others,[b] who have pointed out that Dr. Clouston's diet-table included no vegetables, and have attributed

[a] It will be remembered that Latham considered that the ailment which he had to treat at Millbank developed itself in three forms occurring contemporaneously in the same or in different persons—bowel trouble (dysentery), scurvy, and certain obscure nervous symptoms. No special nervous phenomena appeared among my patients. Cases of scurvy appear to have been not infrequent in former times in the Richmond Asylum. Mild scorbutic symptoms appeared in some of my dysenteric patients who had been ill for several weeks. This arose, I believe, from an almost entirely farinaceous diet having been maintained for an injudiciously long time in these cases, some of whom (old inhabitants) were probably predisposed to scurvy by the insufficiency of vegetables in their diet before the oncome of dysentery. Early in the autumn of 1887, while I was absent on my annual holiday, heavy rain occurring after a long drought, the number of cases of dysentery ran up to a very alarming figure. It was thought that the use of vegetables might have something to do with the outbreak. The dietary was accordingly altered by the total omission of vegetables. The weather becoming dry again, for that, or some other reason, the cases of dysentery became fewer. Feeling assured that excess of vegetable food was not responsible for the disease, I permitted, after my return, the continuance of the change for purposes of demonstration. When rain came again, dysentery appeared once more as freely as ever. Vegetable diet was then at once resumed, but it was too late, for several cases of scurvy occurred within a few days. Vegetables had been discontinued for just two months. The short period of abstinence required to bring about scorbutic symptoms indicates that the original dietary did not contain sufficient vegetable food. At the same time, this entire history shows that there was no special connection between the dysentery and the scurvy. The latter affection appeared both among the sufferers from dysentery and among the other patients when the point of vegetable starvation was reached. Since that time the supply of vegetable food has been abundant (112 oz. per patient per week). Scurvy has not reappeared. Dysentery continues to prevail.

[b] Aitken has also made a similar blunder in reference to the earlier epidemic at Millbank, apparently forgetting Latham's second report, and overlooking the fact that Baly found dysentery still rife at Millbank many years subsequently, in spite of the improved dietary.

the so-called scorbutic type of the illness to this want. Suspecting an error, I communicated with Dr. Clouston, and I have his authority for saying that the omission of the mention of vegetable food in his description of the dietary was a mere accidental oversight, and that the patients and attendants at Carlisle had an abundance of vegetables. There are two or three facts that dispose of the question of diet. Clouston's attendant got dysentery after being three days in the asylum. Nothing but poison of some kind will account for this. My attendants got abundance of vegetables, and much more variety of food than it is possible to give the patients, yet two of them contracted dysentery. Finally, a considerable number of my patients got dysentery after being so short a period in the asylum that the most faulty dietary could scarcely have had time to bring about any serious change in the constitution.

Table *showing the length of residence in Asylum before the first symptoms of Dysentery appeared in those who suffered from that affection, from September* 1, 1886, *to December* 31, 1887.

Length of Residence when attacked	Number of Cases
13 days	1
14 ,,	3
19 ,,	1
21 ,,	1
22 ,,	2
23 ,,	1
24 ,,	1
25 ,,	1
27 ,,	1
31 ,,	1
1 month and under 2 months	13
2 months ,, 3 ,,	8
3 ,, ,, 4 ,,	3
4 ,, ,, 5 ,,	7
5 ,, ,, 6 ,,	3
6 ,, ,, 7 ,,	2
7 ,, ,, 8 ,,	6
8 ,, ,, 9 ,,	1
9 ,, ,, 10 ,,	1
10 ,, ,, 11 ,,	2
11 ,, ,, 12 ,,	1
1 year and over	87
	147

The preceding table indicates a state of affairs such as one would expect to result from local malarial influences, but which is quite incompatible with the notion of a constitutional condition arising from a slowly acting alteration in nutritive functions—which may be thus summarised: one patient was attacked with dysentery within thirteen days residence in the asylum; four, within fourteen days; thirteen, at various periods within thirty-one days; thirty-four patients were attacked within three months of their admission to the asylum; and sixty (*i.e.*, 40·8 per cent. of all the sufferers) within one year.

What, then, are the conditions that we find existing at the Richmond Asylum, which I believe to be productive of dysentery? The Richmond Asylum stands on a rising upland, could have been easily drained, and, if it were constructed on modern principles, might be expected to be a salubrious place. All the surface soil about the buildings is loose earth, much of it "made" earth, all very porous and very shallow, nowhere more than from three to four feet, often not more than eighteen inches deep. The subsoil is a very thick layer of stiff boulder clay, in the highest degree tenacious and impervious. The buildings are, in great part, old, and the mode of getting rid of excreta was probably originally very primitive. All the sanitary arrangements have undergone numerous alterations—various parts at various times, but quite without reference to scientific experience, and indeed without definite plan. The usual result has been produced, but to an extent rarely paralleled. It would be inopportune to enter into any minute details; but it may suffice to say that there is ample evidence that the ground under and around the buildings is everywhere saturated with sewage. In some places, even the walls have absorbed sewage. Cesspools exist in close proximity to the buildings. Many are even built in angles of the buildings, so that two house walls form two walls of the cesspool. Soil pipes and sink pipes open directly into these, and the overflow drains, some square rubble, some badly jointed pipes, run under the dwelling rooms. From the nature of the soil, as explained, it will be seen that the most dangerous materials must lie and decompose between the

surface and the subsoil. The impervious boulder clay admits of no escape.[a] As far as my experience during the fourteen months reported upon enables me to judge, I believe that what occurs is this:—While the weather is continuously dry there is little danger. Rain, especially when accompanied by heat, either acts in some such way as to set loose latent germs, or simply renders the earth incapable of absorbing and altering the injurious materials. Dry earth is known to be a good deodorant, and, perhaps, antiseptic. Moist earth possesses no such properties. Therefore, the period of greater danger is damp weather, and the period of the greatest danger is when sudden rain succeeds to a long continuance of dry weather. This was remarkably borne out by the violent outbreaks of dysentery that occurred in the autumns of 1886 and 1887, when these conditions were very perfectly fulfilled.

If it be said that the explanation I suggest cannot be accepted owing to the difficulty of understanding the production of the dysentery germ or poison, *de novo*, it may be replied that the same objection might be made when we account for the production of typhoid fever through contamination of drinking water; but, in the case of the present outbreak, the difficulty can hardly be said to arise, since dysentery has existed to a greater or less degree almost continuously (perhaps quite continuously) since 1817.

In laying down the following conclusions, to which I conceive my observations naturally lead, I can lay claim to no originality. In a subject about which so much has been written, that was hardly to have been expected. I can only say that the disorder I have unfortunately had to treat has followed with tolerable strictness what appear to be the laws that regulate the appearance of dysentery.

[a] I think it right to note that the Governors of the Richmond Asylum, having had their attention drawn to the sanitary state of the institution by my Report for the year 1886, have generously adopted a very complete and extensive scheme of new sanitary buildings and drainage, which is at present being carried out according to the plans of the well-known sanitary engineer, Mr. Kaye Parry, and under his supervision.

1. Dysentery is communicated through exhalations from a soil saturated with the products of organic decomposition.

2. The incidence of dysentery at particular times and seasons is due to the relative moisture of the soil at such times (or, at least, to its degree of saturation with moistened organic matter. It is conceivable and even probable that a very great excess of rain may dilute the poison or wash it away). High temperature seems to be a contributing agent.

3. When dysentery breaks out there is commonly a concurrent outbreak of diarrhœa of a severe form.

4. Dysentery appears where dysentery has been before.

5. When dysentery appears over a large area, including its old haunt, it appears in the latter situation in its worst form and to the greatest extent.

6. Like other malarial affections, dysentery attacks by preference those who are not acclimatised to the conditions that have produced it.

A CASE OF DISEASE OF NERVOUS SYSTEM, PRESENTING SYMPTOMS OF TUMOUR IN WHICH ONLY MICROSCOPICAL CHANGES WERE FOUND.

By WALTER BERNARD, F.K.Q.C.P.

[Read before the Section of Pathology, January 13, 1888.]

On 16th February, 1887, Mary Stewart, aged twenty, was first seen.

History.—In November, 1886, she noticed her sight commencing to fail. At that time she had "soreness" in her forehead and a little "dizziness." Her mother told us she "could not thread a needle three weeks before Christmas." On 9th February, 1887 bilious vomiting set in. She had great difficulty in walking, and her sight was very defective.

On February 16th we found her in bed. Face was ruddy; body well nourished; knee-jerks exaggerated on both sides, particularly on right; ankle-clonus easily elicited on right side, not on left; pupils large, acting very little, if at all, to light; no nystagmus; left disc normal; right disc moderately inflamed; sleeps a good deal; mind seems clear, and she answers sensibly any questions put to her. Vomiting is complained of. Has never had a discharge from the ear. No ptosis. Can look in any direction, but is slow in moving her eyes. Menstruation normal. Cannot count fingers. Has some pain in her forehead. Family history throws no light on case. No history of tubercle or nervous disease.

February 23rd.—Patient drowsy. Vomiting still present. On 20th she, for the first time, passed her urine in bed; since 19th has had no pain in her head.

26th.—Patient very drowsy. Answers slowly when asked any questions. Pulse 84, small and weak. Head, when she lies on back, tends to turn to right side. Yawns frequently. Passes urine and fæces in bed.

March 2nd.—Neck is stiff. Head is turned to right side; she does not like to have it moved from this position, as it gives her pain.

5th.—When awake she has a peculiar staring look. This is from retraction of the upper eyelids. The mother says they appear "as if they were catched up;" vomiting has ceased; knee-jerks are not now exaggerated on either side; ankle-clonus still present on right side.

12th.—Right disc moderately inflamed; left disc œdematous on its nasal side; ankle-clonus could not be elicited; saliva comes from one angle of the mouth.

16th.—Knee-jerk is absent on right side—present slightly on left side; complains of soreness in front part of neck; there is tenderness here, but no swelling.

23rd.—Does not notice when the finger is brought close up to the eye; nasal side of left disc inflamed.

26th—Upper eyelids are not now retracted; vomiting has returned. Mother says, on the 25th she had an "attack of nerves" in her throat.

30th.—Patient knows when the hand is waved before her eyes; temperature is subnormal; sphincters have to a great extent recovered. Was sitting up in a chair.

April 9th.—Has her legs drawn up; it pains her to get them stretched down.

20th.—We found that right arm has very little power in it. On 18th April she had two fits; she "worked" a little in them. After fits she vomited a large quantity of green matter.

23rd.—She was found in a fit; she was quite unconscious, but not convulsed; eyes were turned up; she was pale and changed colour somewhat. Mother attributes this fit to her bowels being confined and the administration of an enema by a nurse.

May 11th.—There is marked nystagmus. Her eyes tend more to left than to right. Her mind is affected. She fancies she is not in bed but on her feet.

14th.—Eyes tend towards left; oscillate from side to side about 42 times in the minute; movement is rapid towards right, slower

towards left. The excursion of the eyes is not great, and when furthest towards right barely look straight forward.

21st.—Cannot look to right; with an effort she can look straight forward. Left upper eyelid follows eye downward less than right. Left arm is weak, but is not so bad as right.

28th.—Eyes do not oscillate as frequently; are not looking so much to left, and can move better towards right. Can turn her head to either side without difficulty. Legs still drawn up. It hurts her to have them straightened. Optic neuritis in right eye is subsiding. Temporal edge can be defined by direct method.

June 4th.—Is looking quite straight. Can look to both sides fairly well. Nystagmus still present. Is menstruating for first time since early part of illness.

11th.—Complains of pains in her knees; legs are drawn up. Her mother told us she has some pain in her head occasionally.

22nd.—In right eye the neuritis has almost completely subsided, and disc is whitish. The swelling on nasal side of left disc has also subsided. Has control over rectum and bladder. Left arm is very weak; she cannot put it up to her head; can put up right without any difficulty.

July 9th.—She was found asleep. On opening eyelids pupils were found considerably contracted. When she awoke pupils immediately dilated, and remained large. With left eye she can count fingers. During sleep there was no nystagmus.

23rd.—Nystagmus very slight—rotatory. Dr. M'Caul was obliged to draw off urine. She died of exhaustion on the 8th August, 1887. She could speak four hours before death, and could swallow to the last.

Post-mortem was made next day. Brain and part of cord were examined. Membranes were found to be normal. Brain was no fully examined until hardened by alcohol. No tumour was found anywhere. Ventricles were not dilated. Right optic nerve shows evidence of neuritis. I show you parts of brain and cord which you can examine for yourselves. Parts of some sections do no take up the stain of logwood, probably on account of defect in the

stain. In the cervical part of the spinal cord one anterior horn was found atrophied. In the medulla there were found amyloid bodies in abundance, and some evidence of sclerosis.

Remarks.—Dr. Hughlings Jackson reports a case in which symptoms of tumour were present during life, but after death only microscopical changes in the substance of the cortex were found. (See "Fagge's Medicine," 2nd edition, vol. I., p. 630). The case recorded above in some particulars resembles Dr. H. Jackson's case.

SUICIDAL WOUND OF THE HEART WITH A PIN.

By WILLIAM THOMSON, M.A., F.R.C.S.;
Surgeon to the Richmond Hospital; General Secretary to the Royal Academy of Medicine in Ireland.

[Read in the Section of Pathology, January 13, 1888.]

The following notes of a case of unusual interest were supplied to me by Mr. Leonard H. Kidd, and they are so accurate that I submit them to the Pathological Section as I received them:—

"On the morning of Monday, 28th November, 1887, while acting as House Surgeon in the Richmond Hospital, Dublin, I was called to see a 'case' that had been brought to the hospital in charge of the police. The man was dead, and as the result of my examination I concluded he must have been so at least half an hour. The policeman in charge gave the following history of the case:—The man had been arrested on Sunday, the 27th, at about seven a.m., and was supposed to be a lunatic, as he was wandering about the streets with no other covering than his shirt; while in the police cell he was very restless, walking continually up and down, stamping, and constantly calling on imaginary friends and foes, declaring that there were serpents and other reptiles about his neck.

"At about 3 30 on Monday morning the constable on duty heard him fall, and on opening the door found the prisoner half sitting, half lying on the floor, with his back against the door. The constable tried to raise him, the prisoner muttered some words and fell back again; immediately he was put on a stretcher and taken to hospital, a distance of a little over a quarter of a mile.

"I made a most careful examination of the corpse and could find no signs of injury or violence about the head or body, except a few trifling scratches and bruises; no injury to the mouth or

tongue; no smell of alcohol; the pupils equal and normal; *rigor mortis* just commencing in the lower jaw.

"When putting the stethoscope to his heart I noticed something peculiar about the skin; on closer examination I found that in the 6th costal interspace of the left side there was a pin driven into the tissues and firmly fixed there, only its head remaining above the skin; the exact position of the pin was a spot 2½ inches from the nipple downwards and inwards, and 2¾ inches from the middle line of the body, its direction backwards and slightly downwards.

"The skin round the pin was creased, and looked as if, before the pin had been thrust in, the skin had been stretched downwards, as one does in paracentesis thoracis to make a valvular opening—its elasticity, when the pressure was removed, causing it to wrinkle round the pin. The pin, an ordinary toilet one, was 1½ inches long. The man was rather broad-chested, and, as the above measurements show, the pin puncture was exactly in the area of the cardiac impulse.

"The *post mortem* proved the pin had traversed the pleura, the pericardium, and wounded the anterior wall of the left ventricle; it was found the pin had passed into the chest between the external ends of the 5th and 6th costal cartilages. On the pleural surface of the puncture there was some slight recent pleuritis, and thickening of the pleura; elsewhere, on both sides of the chest, the pleura was perfectly healthy, with the single exception of an adhesion of the pleura covering the root of the left lung to the adjacent pericardium.

"In the left pleural cavity there was a small amount of blood, most of which, I think, must have escaped from the pericardium during the manipulations, as immediately on touching the pericardium blood oozed from it.

"On the anterior surface of the pericardium, in a position corresponding to the puncture, I found a small blood-clot; around this there was some thickening of and extravasation into the substance of the pericardium; removal of this clot exposed a hole in the pericardium with irregular edges, and measuring ¼ in. in

diameter, and pure blood escaped from the sac of the pericardium (which was tense and distended), which, when taken up and measured, amounted to 17½ oz.

"On the anterior aspect of the heart was a large clot, weighing 2½ oz., taking its origin from a rough granular surface, as large as a shilling, and corresponding to the position of the pin's point, the heart being here denuded of the visceral layer of the pericardium, and presenting a jagged appearance. This lesion was situated almost entirely on the wall of the left ventricle, where the latter comes a little forward to form the apex of the heart, extending across the interventricular groove, slightly encroaching on the margin of the right ventricle. On the floor of this 'ulcer,' a quarter of an inch from the ventricular septum, there was a vein with an opening in it; the long axis was parallel with the course of the vessel, and just admitted the point of a fine probe. This vessel, a tributary of the great coronary vein, opened into the great cardiac sinus.

"The cavity of the ventricle was not implicated, as proved by forcible injection of water, followed by careful and gentle probing. It is interesting to add that the internal organs were all congested, especially the kidneys and liver, the latter weighing 7 lbs. 12 ozs.; the bladder was full of albuminous urine, the result of the renal congestion (?), the intestines and their contents being bile-stained. The contents of the stomach were not examined. The venous sinuses of the skull were all distended; the substance of the brain showed nothing abnormal, but the lateral ventricles contained more than the normal amount of fluid."

This case adds another to the long list of injuries to the heart in which the patients have survived for a considerable time. Fischer's collection of 47 cases of wounds of the heart, in which the patients lived for periods varying from an hour to 52 years,[a] gives a sufficiently full record of the curiosities of such injuries. It may be interesting, however, to note the following cases in some detail:—

Mr. Frederick Wright reports in the *British Medical Journal*, Nov. 13, 1869, the case of a boy, aged five years, who stuck a

[a] Holmes' System of Surgery. Third edition. Vol. I, p. 852.

common sewing needle into the front of his dress; accidentally he drove it into his thorax. While endeavouring to extract it by pulling the thread, the needle broke off. The mother saw a slight mark but no bleeding. He went to school. Next day he had pain in the chest; on the second day the pain extended to the chest, neck, and shoulder. On the evening of the third day he walked up stairs to bed. Hearing him call, the mother ran up stairs and found him getting out of bed. He died in half an hour.

At the autopsy, there was a slight mark over the cartilage of the 5th rib, and about one and a half inch from the middle of the sternum. "On pressure I could detect a portion of the needle projecting about $\frac{1}{16}$th in. from the surface of the cartilage. On removing about an inch of the cartilage I found that the needle had passed about $\frac{3}{8}$ in. beyond it, perforating the pericardium, which was enormously distended with dark fluid blood." On removing a firm clot of blood which surrounded the heart, Mr. Wright found "that about a square half inch of the surface of the heart was so much lacerated that only a network consisting of a few shreds of muscular fibre remained; this gave way under very slight pressure of the finger. The rupture was very near the apex of the right ventricle. There was not a drop of blood in any of the cavities of the heart."

A girl, aged six, complained of pain in her chest, played about until evening, and was ill all night. She had pain in the chest and abdomen, until next evening, when she died.

At the autopsy, held by order of the coroner, Mr. Flloyd Peck reports that the scalpel struck against a metallic body, which proved to be a stout needle, which had been thrust through the junction of the sternum with the cartilage of the third rib, and broken off short externally. A corresponding small spot was then noticed on the skin of the chest. The part projecting inwards measured about an inch, and had wounded one or two mediastinal veins, and made a small opening into the pericardium, which was full of blood. There was considerable bloody infiltration into the tissues around. The external wall of the right ventricle was frayed, as it were, with the point of the needle. On inquiry, some complaint had been made by the child of a needle which she had

in her pinafore having been broken and having pricked her.—(*Provin. Med. and Surg. Journal.* 1852. P. 336).

Dr. Sklarsky, a Russian physician, relates a fatal case of aneurysm of the aorta, in a woman, and on making an examination a sewing needle, one inch long, was found so firmly imbedded in the substance of the right auricle, and so corroded that it broke into several pieces on an attempt being made to extract it. He supposed that the needle had been swallowed, had passed from the œsophagus into the aorta, and so produced the aneurysm, whence, by the movements of the heart, it was thrust into the auricle.—(*Brit. and Foreign Med. Review*, July, 1845).

Dr. Leanning reports a case in which a young woman, when stooping over a table, ran a needle into the right breast; a month subsequently was seized with pleuritis. Five months later she had pneumonia, and pain about the heart and pericardium. After death the needle was found passing from the back through the right ventricle into the left.—(*Phil. Med. Examiner* and *Brit. and F. Med. Rev.*, July, 1845).

M. Caen has published the case of a woman, aged twenty-six, who, being in prison and dreading to be brought to trial, resolved to destroy herself. This she accomplished by thrusting about thirty pins and needles into her chest in the region of the heart. She introduced them with great gentleness, and used to press them inwards with the aid of her prayer-book. She died on the day preceding her trial. Numerous needles were found; one reached the back part of the right auricle and perforated the descending cava. The anterior portion of the left ventricle was transfixed by a needle, and a small clot had formed around it within the cavity of the ventricle. The œsophagus was also perforated.—(*Lancet*, 1863).

At a meeting of the Scientific and Literary Institute of Milan, Dr. Biffi presented the heart of a lunatic, the left ventricular cavity of which contained a needle six centimetres (nearly 2½ inches) long. The point, after perforating the valve, projected for a centimetre into the left auricle. From inquiry it appeared that the man had introduced the needle into his heart about 22 months before his death, and that the act was not followed by the least inconvenience.—(*Brit. Med. Journ.*, Nov. 27, 1869).

MULTIPLE (PYÆMIC) ABSCESS OF THE LIVER AND LUNGS.

By J. MAGEE FINNY, M.D., Univ. Dubl., F.K.Q.C.P.;
King's Professor of Practice of Medicine;
Clinical Physician to Sir Patrick Dun's Hospital.

[Read in the Section of Pathology, January 13, 1888.]

The case I bring under the notice of the Academy is one possessed of some points of interest beyond that of its intrinsic nature.

One such interesting feature I conceive to be the long duration which elapsed between the occurrence of the original inflammatory disease of the peritoneum and the infection through the splenic vein, which produced the final abscesses of the liver and lungs.

And a second point I would indicate in the mode by which the putrefactive virus was introduced, so as to convert a chronic inflammatory thickening of an old localised peritonitis into a centre of infection and pyæmia.

The following are the clinical records, taken by my clinical clerks, Messrs. Kenny and Tuthill:—

R. B., aged twenty-seven, unmarried, was admitted to Sir P. Dun's Hospital, November 16, 1887, under my care, with the desire of breaking off a habit of using morphia hypodermically as a stimulant—a practice he had acquired four years previously, and which had latterly completely mastered and demoralised him. It is not cognate to my subject to refer to this further than to state that the medical use of morphia was first recommended and applied in this city by physicians of the highest reputation for the relief of suffering, referred by the patient to the region of the stomach, under the left costal arch. He stated that it was a question among his medical advisers as to whether he was suffering from cancer at that time. The morphia relieved his pain, and eventually he was cured of his symptoms for a couple of months. It then returned, and he used the morphia himself, and

thus became addicted to its use, and, finally, he could not do without it—his allowance latterly being 12–13 grs. per diem, 3 grs. or 60 ♏ of Pharmacopœial hypodermic solution being the dose he found sufficient to procure 4-6 hours' comfort.

I mention these facts as they probably indicate the time when he had a localised peritonitis adjoining the splenic flexure of the colon. At this time and frequently subsequently he had much difficulty in properly evacuating the bowels, and he described the peristaltic action of the bowel as being violent up to the point referred to, in the left side of the abdomen, and then as being arrested.

On admission he presented an emaciated, sallow appearance, and stated he had lost 3–4 stone in weight. His appetite was almost *nil*, and his bowels were very hard to move.

On November 27th, ten days after admission, he complained of pain in the left side of his abdomen, at the level of the umbilicus, and shifting towards the left lumbar region, and the bowels had not moved for three days. Aperients and soap and oil enemata produced little result, and for the succeeding week he presented the symptoms of enteritis—viz., his tongue became furred, the papillæ red and prominent, the temperature febrile, reaching a maximum of 102·8° on December 1st; with the usual accompaniments of headache, loss of appetite, and sleeplessness. Several hard lumps were removed by enemata of linseed tea during this time, while physical examination produced pain in the place indicated, and revealed by percussion an increased area of dulness, which corresponded to that of an enlarged spleen. The urine was free from albumen or indigo.

Some improvement in his general and local symptoms followed for the next ten days, when again the fever rose, and from December 10th to 20th, when death occurred, it ranged from 101° in the morning, to 102·5° in the evening (on the evening of 15th going up to 103·6°). Night perspirations during sleep were now and then noticeable, but they were not always excessive. On December 15th, for the first time, he had some purulent expectoration, which on one or two occasions contained a little blood. It was, however, unlike pneumonic sputum. Careful and repeated examinations of the lungs resulted in negative results beyond a slight and limited patch of dulness at the inferior angle of the right scapula.

Subsequent observations elicited mucous râles here and there through both lungs, and the sputa became more distinctly puru-

lent, unmixed with mucous or blood, and free from all bad odour. Slight jaundice was detected in the urine on the 15th, and both liver and spleen are reported to be enlarged.

The jaundice was better marked in the conjunctiva and skin on December 16th, and though present till death it was at no time very pronounced. With the occurrence of jaundice delirium set in, chiefly at night, of the "busy" nature, the patient getting up and walking about. The pulse became very rapid—120, 136, 144, while it lost in body. Sleep, which was before procurable by urethane, left him, and he sank rather suddenly on December 21st.

En résumé. Three periods of about ten days each may be noted. The first, emaciation, malaise and constipation; the second, irregular febrile and gastric disturbance, the pulse not exceeding 100; the third decade closing the scene with pyæmic symptoms—delirium, night-sweats, hectic fever, and rapid pulse, and also the local manifestations of secondary abscesses of lungs and liver by purulent expectoration, jaundice, and enlargement of the liver.

Post-mortem Examination of R. B.[a]

Left Lung.—Upper lobe emphysematous, especially in front and superficially. Lower lobe (pleura thickened) was in a state of pneumonic consolidation, friable; on section was greyish in colour, and there were some yellow purulent spots.

Right Lung was emphysematous. On section there were found several yellow purulent spots, better marked than in left lung, and localised to one area. Lower lobe was in a state of congestion; there were several small loculi full of purulent matter, exactly like the expectoration. This lung is not friable; the abscesses are most likely embolic in origin; very little redness surrounded the depots of pus. There were some enlarged soft glands at the roots of both lungs.

Liver is greatly enlarged, but preserves its normal shape. On its surface are small, grey, slightly-elevated spots, varying in size from a large pin-head to that of a split pea, many of them being in clusters; are most marked on left lobe; on under surface of liver they are very plentiful. There are signs of late peri-hepatitis on under surface of liver, thick flakes of lymphy exudation existing in the sulci on each side of the gall-bladder. On section are found small abscesses, the size of a pea, scattered throughout the liver, and are very numerous.

[a] Notes taken Dec. 23rd, by Mr. Alfred Tuthill.

Gall-bladder is thickened and indurated, especially at the cystic duct; contains some bile, which is of a normal rhubarb colour.

Common Bile Duct is not obstructed.

Cystic Duct at exit appears to be thickened.

Hepatic Duct.—There is a small abscess in wall of right duct, and would most likely account for the jaundiced condition of the patient.

Stomach appears to be free from disease, there being no thickening or ulceration.

There is great thickening and matting together of the *gastro-hepatic omentum.*

Gastro-splenic Omentum is shorter than natural; the back of the stomach is adherent to the pancreas.

Pancreas.—The tail of the pancreas is thickened and matted to the splenic vessels, and is also tightly adherent to the lower portion of the spleen.

Spleen.—Its size and its anterior edges are normal. The inferior extremity is adherent to the kidney by a very thick mass of inflamed peritoneum. The splenic flexure of the colon is adherent to the spleen. Spleen has a small irregular abscess in its posterior peripheral substance, which has a minute communication with the large abscess behind it. Otherwise it appears healthy.

Immediately in relation to the spleen was found an abscess, bounded in front by the spleen, behind by the pancreas and kidney, below by the large bowel, into which it discharged.

The abscess contained two ounces of cheesy, grumous material. This abscess seems to have originated in old peritoneal adhesions, and is not a true nephritic abscess—although the kidney is adherent to, and cannot be separated from it.

The Kidney (left) presents a small abscess in the cortex, adjoining to and communicating with the above abscess.

The pelvis of the kidney is only congested; there are no signs of pyelitis. The ureter is free, and not congested. The greater portion of the substance of the kidney is healthy; the cortex is slightly paler than normal.

Great Intestine—Splenic Flexure is adherent to spleen and abscess; is not inflamed. Two small perforations were found leading into the cavity of the large abscess.

Duodenum.—There is a thick mass of inflammatory products near the first part of the duodenum in the gastro-hepatic omentum; but it does not appear to have hindered in any way this portion of the gut.

Mesenteric Glands are enlarged and pinkish in colour; but no yellow masses can be found in them.

Inf. Vena Cava appears quite normal.

Hepatic Veins appear quite free.

Brain and its membranes appear normal.

Remarks.—The order of pathological processes is, as I take it to be, somewhat thus :—

Four years ago a localised peritonitis occurred above the splenic flexure of the colon, matting the bowel to the front of the left kidney, the spleen, and the tail of the pancreas. This was probably cured by the rest obtained from the morphia. It left, however, an amount of fibrinous material, which hampered the free movement of the bowel, and induced attacks of constipation. During the patient's residence in hospital one such attack came on, and produced fæcal lodgment, which, when removed, was described as if it had lain a long time in the bowels, and was covered with a thick coating of white felted matter.

The contiguous old inflammatory thickening was again the seat of fresh inflammation, and, probably, by the introduction, through the adherent bowel, of the putrefactive bacteria, an abscess was readily formed, which found an easy growth in the already diseased tissues.

I think this abscess remained a local abscess up to the last ten or twelve days of the patient's life, and though it pressed upon the kidney behind, and involved it in its wall, it did not infect the patient until it had made its way by a small track into the substance of the spleen, which formed its anterior boundary. The pus now directly entered the circulation on or about the 10th December, and by the vena portæ was carried embolically into the liver, where it produced thousands of secondary small abscesses, and these again, through the hepatic radicles, became the infecting media of the lungs.

The interval between the embolic infection of the liver and that of the lungs subsequently must have been very short, as the jaundice and enlargement of the liver, and the occurrence of expectoration of pus, were all noticeable about the same day, the 15th December.

Murchison gives the course of cases of pyæmic abscesses of the liver as two to three weeks, and not exceeding three months, in duration. The much shorter duration in my case may be justly attributed to the previous cachectic and emaciated condition induced by the morphia.

In conclusion, this case, if it does nothing more, adds another confirmation to the grave consequences which, perhaps many years after the primary lesion, may follow on peritoneal inflammation, however limited in size it may originally have been.

CASE OF HYDATID TUMOUR OF THE DELTOID MUSCLE.

By CHARLES B. BALL, M.D., F.R.C.S.;
Surgeon to Sir Patrick Dun's Hospital;
President of the Section;

AND

J. ALFRED SCOTT, F.R.C.S.I.

[Read before the Section of Pathology, February 17, 1888.]

Case.—M. C., a housemaid, aged twenty years, was admitted into Sir Patrick Dun's Hospital, July 29, 1887, with a tumour about the size of a turkey's egg, situated on the outside of the right arm. She stated that it commenced three years previously as a small nodule, which had since gradually and painlessly enlarged. It was only after a hard day's work that she experienced any discomfort in it. She had never lived in a house where house dogs were kept.

The tumour was situated over the right deltoid muscle. The skin was freely movable over it; but it was obviously attached deeply, as it became fixed when the muscle was brought into action The sense of fluctuation was not distinct.

It was determined to explore it by incision, no diagnosis having been made previously. Upon making an incision, about six ounces of thin pus escaped, and also a cyst about the size of a large grape. The capsule, which was very thick-walled, was dissected out. The wound was closed by deep sutures, and dry dressings employed. The wound ran an aseptic course, and healed under a single dressing.

Upon examination of the cyst it was found to be exceedingly thin-walled, and it had ruptured after removal. No daughter-cysts or hooklets were to be found. Projecting into the interior of the cyst was what appeared to be a retracted head, but it was

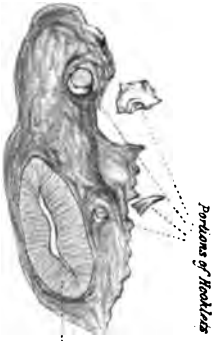

Fig. 3, × 100

Fig. 2, × 70

Fig. 1, nat. size.

F. Huth, Lith^r Edin^r

Dr Ball's Case of Hydatid Cyst.

so opaque that the details could not be made out. The cyst wall was laminated, but otherwise structureless. The enclosing capsule was formed of condensed connective tissue, and projecting into its interior were a number of pedunculated masses of fat.

The specimen which was removed from the cyst, having previously been mounted whole in glycerine jelly, and being too opaque to make out any structure, was unmounted, and found to be a little flattened by pressure. It was a small oval disc, measuring about 4 millimetres long, 2 millimetres broad, and 0·5 mm. thick, which would approximately represent a sphere of 1·6 mm, diameter (Fig. 1).

It was stained in ammonium picro-carminate, embedded in paraffin, and cut in a series of sections of known thickness.

On examination, all the sections showed a tissue similar to that seen in tape-worms, and many showed what were undoubtedly sections of a retracted head, having four suckers (Fig. 2). In some, fragments of hooklets were found (Fig. 3); in these, by counting the number of sections in which fragments of one hooklet could be seen, their length could be obtained, which agrees very closely with those from cysticercus cellulosa. The accompanying plate was drawn by the camera lucida from the sections mentioned above.

RUPTURE OF THE TRACHEA, WITH FRACTURE OF THE STERNUM AND RIBS.

By EDWARD H. BENNETT, M.D., F.R.C.S.;
Professor of Surgery in the University of Dublin, &c., &c.

[Read in the Surgical Section, February 17, 1888.]

I DESIRE to exhibit an example of complete transverse rupture of the trachea, and of fracture of the sternum, taken from the body of a man who had been killed by being crushed between a hoist, used in raising coal, and a wall. The man was dead when brought to Sir Patrick Dun's Hospital. There was no external wound, but blood had poured from the mouth. At the *post mortem* examination the trachea was found ruptured transversely, and the fragments were separated by an interval of one inch. The œsophagus was bruised, but not torn; on the posterior wall the bruising was very defined, being circular in form, about the size of a threepenny piece. Much blood was shed into the tissues around the trachea and œsophagus, but none of the great arteries or veins were torn. The fracture of the sternum was very oblique from above and in front, downwards and backwards; its upper border passed across between the cartilages of the second ribs, while its mediastinal margin was placed below the level of the third pair of ribs. The second and third ribs on both sides were broken, and on the right the fourth and fifth also.

The fracture of the sternum was of interest on account of its rarity. Malgaigne recorded but a single example of it as having come under his notice, during an experience of ten years in the Hotel Dieu of Paris. Fracture of the sternum may be caused by a direct blow, or by an indirect force; flexure of the trunk, or convulsive action, resulting from the throes of labour or violent coughing, are the most common forms of the latter.

The present fracture had been caused by a nearly vertical thrust upon the sternum, which fell with special energy upon the fourchette, and ruptured the trachea. On the mediastinal side the line of fracture passed down as far as the third and fourth ribs. Therefore this example must be referred to the category of fracture from indirect force.

But few cases of rupture of the trachea are recorded. Amongst these, one of the earliest reported by Dunlop resembles this in its history, the accident, almost identical in character, being a blow by the angular extremity of a heavy beam against the mesial line of the neck, while the spine was maintained fixed.

Ordinary text-books contain no mention of this lesion. The earliest recorded case was one by a Dr. Lucius O'Brien, which occurred in the Edinburgh Infirmary in 1818, and was taken from a woman who had been kicked under the jaw and in the belly, and who died next day. In that case there was a vertical rupture of the larynx and upper regions of the trachea, and of the thyroid and cricoid cartilages. In the case known as Dunlop's, also a Scotch case, which occurred in 1818, the trachea was totally divided by the violence of the blow. It was taken from a boy who, while driving the gin of a coal-pit, put himself on the end of the lever, and as it went round he turned to look at something, and his throat came into contact with a post. He survived for several days in great agony. In a Liverpool case the injury was caused by the coupling chain of a railway carriage twisting round a man's neck. He recovered from the injury. In Berger's case, in which the injury was caused by a kick of a horse, the larynx was almost completely separated from the trachea. There is also recorded by Mr. Godlee an example of a vertical rupture from the bifurcation of the bronchi upwards. In the present specimen there was in the œsophagus a mark about the size of a threepenny bit, which evidently indicated the point that bore the blow of the beam or bar which did the injury.

ULCERATIVE ENDOCARDITIS.

By JAMES LITTLE, M.D.;
President of the King and Queen's College of Physicians in Ireland;
Physician to the Adelaide Hospital.

[Read in the Section of Pathology, February 17, 1888.]

This specimen is taken from a man who, during last December and January, was a patient in the Adelaide Hospital. He was a silk-weaver, aged thirty-two, who had recently returned to this country, after having spent a year in New York. Upon his admission it was evident that he was suffering from aortic valve disease. He had a well-marked double murmur along the sternum—the arteries being very visible, and the pulse extremely collapsing; but the other symptoms which he presented did not appear to be those usually met with in cases of aortic valve disease. His mental state was rather peculiar. When he came in he was in such a state that he was barely able to leave his bed, yet he spoke of getting up and going back to America; and during the whole period of his illness it was impossible to get him to explain much about his symptoms, or what it was that distressed him. When asked whether he suffered pain or felt ill, he drifted off into growling complaints of the food that he got, or of his treatment in other respects. His pulse at his admission was about 100, but during the two months that he survived it increased, and a few days before his death had reached 130. His temperature fluctuated a good deal, but was always above the normal, varying from 101° to 103°. His urine was always very highly coloured, turbid from urates, and of a high specific gravity—1030. At first it did not contain any albumen, but during the last three or four weeks of his life was highly albuminous. After he had been about three weeks in the hospital, he complained of severe pain in the right groin, which extended down the thigh, and prevented

him from getting out of bed. At first the pain appeared in the direction of the femoral vein, and we looked for indications of a femoral thrombus, but it was found not to exist. About a fortnight later he complained of severe pain below the left costal arch, and such tenderness of the epigastrium below that arch that I thought peritonitis was present. During the last week of his life he complained of severe pain down his left arm, and did not appear to be able to move the arm. At that time he was in a listless, drowsy state, not speaking much, and taking little food. There had been a good deal of speculation as to what was wrong with him; it did not appear that his symptoms could be attributed to any mechanical lesion of the heart. He said that while in New York he suffered from malarial fever, and it was thought by some that malarial intoxication accounted for most of his symptoms. Others thought that there was a deficient supply of blood to the brain and central nervous system, due to insufficiency of the aortic valves, and that that was enough to account for most of the symptoms. I did not think either of these hypotheses sufficient. About three weeks before his death, and not till then, the idea occurred to me that the case was one of septic or ulcerative endocarditis. Acting on that guess, I endeavoured to flood the man's blood with sulpho-carbonate of sodium, but it did not prove efficacious. He died two months after his admission. A *post-mortem* was made by Dr. Bewley, who found the lungs too full of blood, especially in the most dependent parts, which was doubtless due to the length of time the man had lain on his back in bed. His liver was likewise too full of blood, but had no other morbid appearance. The kidneys appeared quite healthy, save that the left one had two or three fawn-coloured infarcts. The spleen, over which at one period of his illness he complained of severe pain, was found to be very much enlarged, and in its centre was a considerable-sized abscess, from which, when opened, two or three ounces of chocolate-coloured fluid flowed. There was also a small abscess in the upper end of it. The right cavities of the heart were empty. The whole heart was rather bigger than it should be—the enlargement being due to thickening of the walls, and

some increase in the size of the cavity of the left ventricle. The aortic valve, on being tested, was found to be quite incompetent; a stream of water flowed through it. On opening it all the valvules were found to be more or less puckered and thickened. The first portion of the aorta did not present, on the surface, any distinct indication of change; on cutting it across the coats were found to be much thickened. The most characteristic appearance was on the anterior curtain of the mitral valve—a patch nearly as large as a florin, distinctly ulcerated, and covered with luxuriant vegetation. Some of this vegetation, and also vegetations from the kidneys and spleen, have been microscopically examined by Dr. Bewley. It left no doubt that the disease was, as I had guessed during the patient's life, ulcerative endocarditis. Though this is a rare affection, it is not so rare as is generally supposed. I can recollect several cases which went to a fatal termination uninfluenced by care or drugs, and which were not understood at the time, but which I now believe were cases of this septic malignant ulcerative endocarditis.

A COMPARISON OF THE PATHOLOGICAL CHANGES IN INTRA-UTERINE AMPUTATIONS WITH THOSE PRODUCED BY ORDINARY AMPUTATION.

By EDWARD H. BENNETT, M.D., Dubl.; F.R.C.S.;
Professor of Surgery in the University of Dublin;
Surgeon to Sir Patrick Dun's Hospital.

[Read in the Section of Pathology, February 17, 1888.]

The etiology of intra-uterine amputations has been so fully worked out in the classical papers published here by Montgomery in 1832, that on this score nothing remains for investigation.

The characters of the stumps, and the features of the deformities associated with them, are such that hardly a doubt can arise in their diagnosis. Only a single group of cases recorded by Simpson, and his views relating to them, suggest any doubt.

Amongst his cases are some which he refers to the class of intra-uterine amputations, in which are found rudiments of digits developed at the site of the cicatrices of the supposed amputations. To explain these, Simpson has assumed the existence of a power inherent in the human embryo to develop anew lost parts as we see them formed in the reptiles, the crustacea, and other lower animals. Whether this be so or not has not been absolutely decided, and only most careful dissection of examples of these deformities can decide the doubt raised by so great authority.

I do not know any observations made in this direction, although I think most of those who have written on the general characters of the deformities discredit the views of Simpson on this one point, and would prefer to place such cases in the category of arrests of development rather than amongst intra-uterine amputations.

I regret that I have had no opportunity of dissecting any

example of this doubtful group, nor, indeed, of seeing one in the living.

I mention the cases to preface a note of the examination I have to submit to the Academy of unquestionable intra-uterine amputations, for I am quite confident that these deformities are of this class.

I have searched the published records of these cases with some care, and except in a very few I have not found any account of the anatomical changes produced in the stumps or in the associated deformities. The condition of the bones divided has been recorded so vaguely that one learns little of value from the descriptions, and nowhere do I find any account of the condition of the divided nerves or other tissues.

The subject I obtained these two hands from was a middle-aged female, dissected this winter in the School of Physic, Trinity College. We could obtain no life-history of her; but even without this, I have said there can be no question of the diagnosis of the deformities. Btoh hands present stumps which are of the rounded form, almost without cicatrix, which is characteristic of the intra-uterine amputation; and on several digits we have in addition the circular narrow grooves caused by compression of the digits less complete than that which caused complete severance.

The right foot, too, otherwise normal, had suffered a similar amputation of the fifth toe at the metatarso-phalangeal joint, quite as free from cicatrix as the finger stumps.

One can make out a minute cicatrix in each stump which moves freely over the deep parts without any adhesion to the bone. I should note here that all the amputations have been effected through joints, and thus, I believe, we get this remarkable freedom from adhesion of the skin-scars to the bones. It is recorded that in cases where the bones have been divided a minute dimple of the skin has been observed adherent to the bone, as one must *a priori* expect. When the amputations are present in the digits they are generally, I think, such as these disarticulations. In each of these a bursa caps the extremity of the bone, and allows the rounded covering of skin, with the scar of the tendons, nerves, &c., to move freely over the bone.

I have noticed this freedom of movement of the coverings of the bone in the living in examples of this deformity, and I conclude the explanation is that the amputation passing through the joint leaves the synovial membrane in great measure intact, and, as it were, provides for a synovial capsule over the extremity of the bone. The very minute size of the scar in the skin is evidently due to the slow pressing in of the skin in a manner similar to and only more complete than in the circular grooves left by the constrictions which were incapable of producing amputation. In these grooves, though the skin remains permanently indented, it presents no trace of adhesion to the deeper structures. A subcutaneous fascia with fat exists in normal form, and the tendons and their sheaths are unaffected. In the stumps the subcutaneous tissues and the ends of the tendons, nerves, &c., are condensed and adherent to each other.

Every one knows that of the structures involved in an ordinary amputation none undergo more remarkable changes than the divided nerves.

Each nerve so cut terminates in a bulb composed of connective tissue and of new nerve fibres—in fact, a true neuroma is formed. In examining these stumps I dissected out the digital nerves to their termination in the tissues covering the extremities of the bones, and was surprised to find in them no trace of the neuromata which I expected. To prevent doubt I have obtained Mr. Brooks' assistance, and he has made separate dissections with the same result. As I had never dissected these details of a finger stump, the result of ordinary amputation, the question at once suggested itself whether there might be any difference in this particular between the behaviour of divided nerves in the minor operations and in the major. Having in the collection a finger stump preserved, I at once made the necessary dissection, with the result which I expected. Here are large and well-marked neuromata, as in the stumps of the major amputations.

Whatever be the explanation, then, there is this difference between intra-uterine surgery and the extra-uterine—a difference which should also be borne in mind in studying, at some future

opportunity, the nerve arrangements to be observed in the group of cases referred to previously, in which Simpson has described the re-growth of amputated digits.

The advantage of the freely moving covering of the stumps in these specimens is evident when they are contrasted with the surgeon's work, and suggests the more general adoption of the plan of operating which, when disarticulation is resorted to, secures this result in many cases—namely, the sparing of the articular cartilage and synovial membrane as much as possible. Yet we still see many surgeons anxious to remove these structures in all disarticulations.

CARCINOMA OF LIVER AND GALL-BLADDER.

By WALTER G. SMITH, M.D.;
Physician to Sir Patrick Dun's Hospital, &c., &c.

[Read in the Section of Pathology, March 23, 1888.]

Mrs. T., aged thirty-five years, admitted into hospital December 30th, 1887. She was a total abstainer, and had always enjoyed good health until about three months previously, when she began to complain of pain in the right side, towards the back. The pain was of a dull aching character. After it had continued for a month or so, the skin became tinged with yellow, and this discoloration gradually deepened in intensity. The appetite remained fairly good, but she had an unpleasant coppery taste in the mouth, and before admission she was liable to vomit food soon after it was taken.

Except for the jaundiced appearance, she bore little sign of being seriously ill. She was well nourished, yet she felt weak and poorly. Her sleep was not good, but there were no other nervous symptoms. The bowels were regular; motions devoid of bile; there was no albumen in urine. After a few days' stay in hospital, the debility increased. She complained of a persistent, dull pain in the small of the back, and upon several occasions she vomited, with traces of blood in the vomit. The liver dulness was increased upwards, and the lower margin could be felt two inches below the ribs; no tumours or irregularities of its surface could be felt. The abdominal veins were not prominent. She was annoyed with piles, and a fortnight after admission passed a considerable quantity of blood *per rectum*. Next day the right ear was attacked with inflammation, was swollen and tender, and of a dusky red colour, the redness extending over malar bone. An abscess seemed threatening; however, all subsided in two or three days.

Towards the end of January a small amount of ascitic fluid had collected in the peritoneum, and gradually increased up to the time of her death. She now sometimes vomited blood, and the feet and legs became œdematous.

Early in February she became extremely prostrate, hiccough troubled her, and nervous disturbances, evidenced by drowsiness, loss of memory, and subsultus, set in. She repeatedly vomited blood, and the day before her death she passed through the bowels a large quantity of disintegrated blood.

She died at 4 a.m., February 12th.

Post-mortem examination 6½ hours after death.

Stomach contained a quantity of thick blood. There was no sign of ulceration.

Kidneys appeared to be healthy externally and upon section, except for being stained with bile.

Peritoneum contained a large quantity of limpid, straw-coloured fluid. Beyond slight thickening and opacity, the membrane exhibited no evidence of inflammation. The mesenteric glands were enlarged.

Spleen was adherent to the parietes. Upon section it appeared to be healthy.

Pancreas was very hard upon section, and was fused with some lymphatic glands into a dense white mass.

Liver.—On the upper surface of the left lobe a cancerous mass, about the size of a florin, was exposed to view. The right lobe was completely adherent to the diaphragm and abdominal walls. When removed from the body, the right lobe was found to be considerably enlarged, especially in thickness. It was quadrilateral in shape. Its upper surface was studded with numerous cancerous nodules, the largest being about 1½ inches in diameter. A number of similar nodules were found on the lower surface also of the liver, and some through the substance of the organ. In colour they were mostly cream-coloured, and often depressed in centre.

Gall-bladder projected as a hard, white, pyriform body below the anterior edge of the liver. Upon section its walls were found to be greatly thickened, and *completely calcified*, except at the tip of

the fundus, where the coats were thin. Its cavity contained a quantity of thick grumous matter, of a dark yellow colour. Scattered through this were a number of small calculi, and the thick, paint-like substance was seen under the microscope to consist chiefly of *cholesterin*. The cystic and hepatic ducts were much dilated, resembling a piece of small intestine.

Intestines.—Mucous membrane healthy. Microscopically the carcinoma was of an irregular polygonal epithelial type.

CHRONIC BRIGHT'S DISEASE.

By JAMES LITTLE, M.D.;
President of the King and Queen's College of Physicians in Ireland;
Physician to the Adelaide Hospital.

[Read in the Section of Pathology, March 23, 1888.]

The kidneys exhibited are the largest I have ever met with. The two weigh rather more than 2½ lbs. Dr. Hilton Fagge mentions a pair shown by Moxon which weighed within a quarter of an ounce of 3 lbs. The man from whom the kidneys now before the Section were taken was thirty-eight years of age at his death. Thirteen years previously he spent several nights in looking for wild fowl on the North Bull, the result of which was that he got an attack of acute nephritis. In consequence he came under my care in the Adelaide Hospital for acute renal dropsy. I do not know whether it is justifiable to connect the state of his kidneys at the time of his death with that past illness, because we all know that acute nephritis usually ends either in death or in a complete cure; and the man appeared to have recovered from that former illness. After five or six years he became subject to winter cough, of which he had attacks every year; but these were never severe enough to oblige him to seek hospital relief until the winter of 1886-7. He then came under my care for dropsy and general bronchial catarrh, his urine being markedly albuminous. After being four or five weeks in hospital he went home apparently quite well. There was no record as to whether his urine was free from albumen at the time he left the hospital, but the man himself said that he heard the clerk who had charge of his case say that it was entirely free from albumen before he went away. The matter is one of consequence, because an important point in the case is the stage of the renal changes that were found after death. About

three months ago he came again to the hospital. He had been ill for two or three months previously, but was unwilling to leave his shop. When he came into the hospital he was extremely dropsical, and his limbs were very anasarcous. The parietes of the abdomen and the loins were very dropsical, and even his upper extremities were more or less so. He was also in a state of intense dyspnœa, and for the first few weeks could not lie down, but had to be propped up in an arm-chair. At that time he generally passed per day between 30 and 40 ounces of urine, which was always highly albuminous, and had a specific gravity of 1012. I was told that a few hyaline casts were once or twice found in it, but I did not see them. The diagnosis made was that he had some chronic form of Bright's disease, with general bronchial catarrh. His pulse was always exceedingly soft and weak, his heart sounds were very feeble. There was no evidence of the cardio-vascular changes that are found in some forms of Bright's disease. He fought off death for more than two months in hospital, and the day before he died appeared as if he might recover. The dropsy had considerably diminished, and he was able to lie down in bed. Besides having a cough and spitting up a great deal of purulent matter, and being dropsical, his urine became more and more scanty during his stay in the hospital; and he had every now and then violent attacks of spontaneous looseness of the bowels, after which he always seemed to be more comfortable. On the day of his death he awoke in the morning after a fair night's rest, with a violent pain low down in his left side. He remained in great suffering during the day, and died in the middle of that night. On a *post mortem* the cause of intense pain was found to be, as we had guessed, acute pleurisy affecting a small portion of the lower lobe of the left lung. It was also found that, in addition to general catarrh with highly emphysematous lungs, he had small cavities in both lungs, and miliary tubercles all through them. His case, as far as the lungs were concerned, illustrated an observation of the late Sir Dominic Corrigan, that phthisis complicated with emphysema was most difficult of diagnosis, but most hopeful as to prognosis. In the lower lobe of this man's left lung is a little nest of softening tubercle,

and just close to it is the portion affected with pleurisy, and, though there was no perforation, yet I think it was the nest of tubercle which determined the point of selection of the pleurisy. His heart weighed 9 ounces, and was soft and flaccid, presenting no sign of cardiac enlargement. The kidneys had somewhat lost the appearance which they presented when taken out. One of them weighed 19 ounces and the other 21¼. They were smooth and rather pale on the surface; the capsules peeled off very readily; and, when each kidney was divided, the cortical portion was of a dull, yellowish white colour, and the pyramidal portion had a vivid red staining. The question is, were these kidneys affected by parenchymatous nephritis since the affection thirteen years previously? All our knowledge, however, forbids such a conclusion. We must conclude that the last disease was of about a year's duration. The kidneys show distinct evidence of amyloid change, which is mostly the case with these large kidneys.

CEREBRAL HÆMORRHAGE.

By JAMES LITTLE, M.D.;
President of the King and Queen's College of Physicians in Ireland;
Physician to the Adelaide Hospital.

[Read in the Section of Pathology, March 23, 1888.]

About three weeks ago, a man, forty-five years of age, was admitted into the Adelaide Hospital in an apparently unconscious state. The story told of him was that, about a week before, he had a violent fit of convulsions, after which he remained in a more or less stupid and confused state in bed. Two days before his admission he had another fit, and then he was brought to the hospital. When we first saw him he was lying in bed with his eyes open, the pupils being equal in size, but moderately dilated. If spoken to, he made some atttempt to answer, but could not speak; but when a little drink was offered to him he swallowed it. He could move both arms and legs perfectly, and there was no sign of paralysis of any of the cranial nerves. The only thing of that kind occasionally observable was a very slight twitching of the left angle of the mouth, and of the left occipito-frontalis muscle. On examining his reflexes we found the knee-jerk extremely well marked in both lower extremities, and the phenomenon known as ankle clonus developed in a high degree. On listening over the heart, we perceived a deficiency in the first sound, and also a well-marked systolic mitral murmur. I concluded that we had to deal with a case of uræmic convulsions, judging by the incompressible pulse and the cardiac signs. His urine had been passed involuntarily in bed; but a few ounces which were drawn off, were found to be highly coloured and densely albuminous. He was carefully observed from that time until his death, and it was noticed that he had no hemiplegia, but moved his arms and legs on both sides;

and, beyond the twitchings of the corner of the mouth and of the occipito-frontalis muscle, there were no indications of paralysis. Early the following morning the man jumped out of bed, put his hand to his head, and went into a violent fit of convulsions, in which he died. On a *post mortem* the diagnosis made was verified so far as the kidneys were concerned. His kidneys contrasted with those in the last case, being in a shrivelled condition, one a little less and the other a little more than three ounces in weight. The capsules were thickened, and when peeled off left a rough granular surface, the organs being good specimens of the small red kidney. The heart shows very distinctly hypertrophy of the left ventricle; and if there is such an affection as concentric hypertrophy, it exists here. The walls are very much thickened. We looked out for the cause of the mitral murmur, but found nothing to account for it. In most of the cases I have examined, in which such a murmur existed during life, some very distinct cause was found for it. The whole arterial system was very much diseased. A portion of the aorta showed in a highly-marked form the changes produced by endarteritis deformans. The circle of Willis at the base of the brain was the seat of patches of similar change. On the right side of the brain was an enormous hæmorrhage, the right lateral ventricle being full of blood, and the hæmorrhage appeared to have taken place in the frontal lobe just outside the right lateral ventricle. There had evidently been two hæmorrhages—viz., one that must have occurred at the time of the seizure a week previously to his admission, and a second one which, I presume, occurred at the moment of his death. There is a clot, which has the appearance of being a week or ten days old, and there is also a large quantity of what appears to be recently poured-out blood. Another proof—which was most distinct when the specimen was recent—that there had been hæmorrhage eight or ten days previously to his death, is, that the brain tissue all round where the clot is had the peculiar softened amber hue that is seen in brain that has been stained by inflammatory changes following hæmorrhage. The case is of great interest in two or three ways. The man had been a soldier, and a very hard drinker at one time of his life. The case affords

an illustration of the chronic form of Bright's disease which occurs in persons of intemperate habits, and of the cardio-vascular changes that were conspicuously absent in the preceding case. It is also an admirable example of atheromatous changes in both the larger and smaller vessels, and a point of great interest is the large cerebral hæmorrhage unaccompanied by paralysis.

CORNEAL FIBROMA (?)

By J. ALFRED SCOTT, F.R.C.S., and J. B. STORY, F.R.C.S.

[Read in the Section of Pathology, March 23, 1888.]

The growth to which we have given the name of Fibroma occurred in the cornea of a young man, aged twenty, admitted into St. Mark's Ophthalmic Hospital, January 31st, 1888. He had suffered from granular ophthalmia for many years, and had been in St. Mark's Hospital in March, 1886. On that occasion, a small yellowish white growth was observed in his left cornea, and this growth now presented exactly the same aspect in size, colour, and position, that it did in 1886. On both his visits to hospital he sought advice and treatment for the results of granular ophthalmia, trichiasis, entropium, pannus, confined to the right eye.

The left eye, too, had suffered to a considerable extent from the ophthalmia. The conjunctival sac was contracted, the inner surfaces of the lids scarred, and the cornea exhibited at its periphery a slight abortive pannus, which had been arrested by treatment, and had never spread further than 1 or 2 mm. from the sclero-corneal margin. The tumour, if we may so term it, occupied the outer upper quadrant of the cornea, was oval in shape, the long axis 6 mm., the short 4 mm., and lay with its long axis perpendicular to the corneal diameter which bisected it (Fig. 1). Its colour was yellowish white, rather more yellow than white, to a great degree resembling the colour of the meibomian glands on the inner surface of the eyelids as seen through the conjunctiva. Small blood-vessels could be seen ramifying over the growth, spreading from the sclero-corneal margin where the latter just came into contact with the nearest portion of the periphery of the tumour. This growth was sharply marked off from the surrounding corneal tissue, its surface was not raised above that of the rest of the

cornea, and the epithelium passed over its borders without a break or any alteration of level whatsoever. It appeared to occupy the whole thickness of the cornea. There were in other portions of the cornea a few faint interstitial nebulæ such as are frequently seen in old cases of keratitis, but in other respects the eye was anatomically normal—viz., tension, depth of anterior chamber, size and activity of pupil, and freedom of iris from all adhesions to cornea or lens.

The unusual appearance of this spot in the cornea excited considerable speculation as to what its precise nature might be. It differed in many respects from any form of cicatricial opacity that has been seen in the corneal tissue, its position being deeper, its shape more globular, and its colour yellower, while its vascularity was too well developed for a cicatrix of some years' standing.

Opinion rather tended to assume that the opacity was of a fatty nature, its colour being strongly suggestive of fat.

The patient was really anxious to have the deformity removed, as he believed that it was increasing—a belief which, however, was not justified by the observed facts, and although he was informed that complete removal was impossible, he willingly consented to have as much of it taken off as could be safely accomplished. As the growth appeared to extend through the whole thickness of the cornea, it was manifest that it could not all be excised without serious damage to the eyeball.

Accordingly, a piece of the growth 4 mm. × 3 mm. was excised under cocaine anæsthesia. There was very considerable hæmorrhage from every portion of the incision, which extended at least half-way through the thickness of the cornea, and probably deeper. No transparent cornea was detected even on the floor of the wound, although subsequent microscopical examination showed that, in places at all events, true cornea had been exposed.

The little ulcer which was left after the removal of this portion of the opacity, healed up in the course of some days, blood-vessels developing with great rapidity all round its borders, and its appearance during the process of repair being more like that of a scleral than a corneal wound.

The portion removed was hardened in Muller's fluid and sections were made from it in a direction at right angles to the surface of the cornea (Fig. 2). From them it was evident that the conjunctiva cornea (*a*) was unaltered, but immediately below this the abnormal tissue (*b*) was to be seen apparently supplanting the fibres of the cornea proper. The portion removed was not equal in thickness to the average cornea, but sufficient tissue had been taken to show the healthy epithelium above, and some true cornea (*c*) below the suspected new growth, the interval between being about 0·2 mm. to 0·4 mm.

The "new growth" was mainly formed of connective tissue, with a large number of blood-vessels, and numerous patches of nuclei; in some places so numerous as to suggest sarcoma, but in others very few. The appended drawing (Fig. 2) shows an average section.

That there was no actual thickening of the cornea in this locality was evident from the fact observed, that its outer curvature was unaltered, it being extremely improbable that the cornea could be bulged inwards by any new growth without its external surface exhibiting a corresponding elevation, so that the condition present in this case is rather to be regarded as a supplanting of the corneal tissue proper by another variety of fibrous tissue, than as a new growth of fibrous tissue developing in this situation.

What the precise pathology of this curious affection may be is not very easy to determine.

Microscopically, the tissue is very similar in structure to a cicatrix, such as might have resulted from an old ulcer, or possibly an interstitial infiltration which became subsequently organised. An ulcer of such a size, and in such a position, could hardly have occurred without perforation, and consequent synechia anterior, which was not present; and the scar left by such an ulcer would have been somewhat pyramidal in shape, the base of the pyramid corresponding to the external surface of the cornea. Now the little tumour here was apparently globular in shape—more accurately, it was egg-shaped, the anterior and posterior surfaces being somewhat flattened as they came in contact with the external and

Fig 1.

Fig 2

Mr J.B Story and Dr J.A Scott on Corneal Fibroma.

J.A S. del

Danielsson & Co. lith.

internal surfaces of the cornea. Finally, it is not usual for corneal scars to keep up the rich capillary vascularity that this fibroma possessed, even when synechia anterior exists.

It is indeed possible to explain the appearances by the supposition of an unabsorbed and organised infiltration of the cornea in this position, and if we could be certain that the cornea had at any period of the boy's life been wholly transparent, we might adopt this theory; but when he came first to hospital he did not seem to be aware of the existence of the spot on his eye, and it was only on his second visit, two years later, that he stated that the spot was growing bigger—a statement which could not be relied on when the notes taken on his first visit were compared with his then condition. It is, therefore, not impossible that the corneal opacity may have been congenital, anterior to the ophthalmia, the results of which induced him to seek medical advice, and if we accept this possibility there cannot be any improbability in a theory which merely assumes a congenital supplanting of one variety of connective tissue by another.

EXPLANATION OF PLATE.

Fig. 1.—Corneal Fibroma (?) Natural Size.

Fig. 2.—Section of same × 100.

a. Conjunctiva.

b. Abnormal Fibrous Tissue.

c. True Corneal Tissue.

SPECIMEN OF UNREDUCED DISLOCATION BACKWARDS OF THE BONES OF THE FOREARM.

By EDWARD H. BENNETT, M.D., Dubl.; F.R.C.S.;
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Surgeon to Sir Patrick Dun's Hospital.

[Read in the Section of Pathology, May 4, 1888.]

I beg leave to exhibit a specimen of unreduced dislocation of the bones of the forearm backwards, preserved in spirit, and with it six similar specimens, preserved after maceration. My object in bringing forward these specimens is to draw attention to the fact that, although the varieties and conditions of elbow-joint dislocation have been very fully described, yet still, as regards the point with which I am about to deal, the descriptions of this commonest of dislocations are, even at the present day, such as are calculated to mislead. They tend to errors of diagnosis. Take Erichsen's description of this lesion :—" The most common dislocation is that in which both bones are thrown backwards, with or without fracture of the coronoid process. This injury is readily recognised by the projection backwards of the olecranon, carrying with it the tendon of the triceps. The articular end of the humerus also can be felt projecting in front of the elbow. When the coronoid process is not broken off it is fixed against the posterior surface of the humerus, the forearm being immovably placed in its new position. When this process is fractured there is great mobility about the joint, and crepitation may be felt as the arm is drawn forwards." I now place before the Academy three specimens in which there is complete dislocation of both bones backwards, the coronoid process resting behind the trochlea of the humerus. To these such a description as that I have quoted from Erichsen

applies exactly, but it necessarily excludes every other variety of dislocation of both bones backwards. It ignores such a thing as incomplete dislocation backwards of the bones of the forearm, of which four examples are exhibited. Incomplete dislocation was first described, with great care—as far as exact description could go—by Malgaigne, but it has been long a subject of discussion as to whether it was known to Hippocrates. The important feature of the incomplete, as contrasted with the complete, is briefly given by Littré:—"The incomplete luxation backwards is the only one in which the olecranon does not appear sensibly altered in position." Denucé, following Malgaigne, has stated clearly the pathological difference between incomplete and complete dislocation, putting it in a very few words, and pointing out in incomplete dislocation the presence of the coronoid process at the level of the trochlea. In the specimen of incomplete dislocation preserved with the soft tissues dissected, as well as in the three other old specimens now before the Academy, the hardly appreciable displacement of the olecranon is well marked. The following description of the injury given by Hamilton, the chief of American authorities, is:—"The relation of the olecranon process also to the condyle is changed, and the upper end of this process, instead of being a little below the internal condyle, as it would be naturally when the arm is slightly flexed, is found carried upwards towards the shoulder, from half an inch or more, above the condyle." From the conditions seen in any one of the specimens, it is clear that in incomplete dislocation no such change in the position of the olecranon occurs. Hamilton makes no allusion whatever to the incomplete dislocation. Another authority of great weight—South—said: "The dislocation backwards is the most common and always the most complete. The coronoid process of the cubit gets behind the pulley-like joint surface of the upper arm bone and rests in the pit formed by the olecranon." That was a description of complete dislocation, no mention being made of incomplete. One of the most recent writers—Treves—in his recently-issued book, says:—"Dislocations of the elbow of all kinds may be partial or complete. More usually they are complete when in the antero-

posterior direction, and partial when the luxation is lateral." That almost excludes the existence of the incomplete dislocation backwards. It was admitted by Malgaigne, and those who studied the lesion about the time that he wrote, that incomplete dislocation of the elbow was more common than complete dislocation. Incomplete dislocations, such as are illustrated by the recent and dry specimens before the Academy, have been allowed to go unreduced because they have not been recognised. Such error arises in great measure from reliance on the test given by the authorities quoted—the displacement of the olecranon above the line connecting the condyles of the humerus. This displacement is present in complete dislocations, but it is absent in the incomplete. To ignore the existence of the incomplete dislocations, or to teach that they are recognised by displacement of the olecranon, "half an inch or more above the condyle," is to insure that they will remain unreduced. Now, it is admitted that backward dislocations of the elbow are the most common variety of displacement of the joint, and of these the incomplete are the more common. In museums, at all events, the latter are the more common, perhaps because they are those most frequently left unreduced. In the moist preparation before the Academy no doubt can exist as to the relative position of the bones—a doubt that some might entertain in the case of the macerated specimens. In the words of Malgaigne, "the projection of the olecranon is on a plane sensibly beneath the projection of the epitrochlea, whilst in the complete luxation the olecranon is placed sensibly above that process." My attention having been directed to the subject by obtaining this recent specimen, I have thought it well to reiterate the statement of Malgaigne—though it was sufficiently distinct, and though it ought to be familiar to writers on the subject—that the incomplete form of dislocation backwards at the elbow does occur; that it is the more common form of dislocation of both bones, which, by being left unreduced, subsequently become museum specimens; and that it probably has in these remained unrecognised because the test of the elevation of the olecranon, relied on in the descriptions of complete dislocation, is applied to it. It is very easy for an in-

complete dislocation to be overlooked when a certain amount of swelling conceals the various features, including the existence of the tumour formed by the displaced humerus in front, and the abnormal projection of the head of the radius backwards. The specimen before the Academy exhibits these peculiar characteristics of partial dislocation; in fact, looking at the back of the elbow, one would say, at first sight, that there was no dislocation at all of the ulna. But the radial dislocation catches the eye, and in front the humerus projects as an unmistakable tumour.

CASE OF ACUTE LOBAR PNEUMONIA AND CHRONIC BRIGHT'S DISEASE.

By JAMES LITTLE, M.D.;
President of the King and Queen's College of Physicians in Ireland;
Physician to the Adelaide Hospital.

[Read in the Section of Pathology, May 4, 1888.]

This was a case of acute lobar pneumonia and chronic Bright's disease in a boy aged four years. This boy was admitted into the hospital under my care on the last day of March. According to his mother's account, he was in perfectly good health until two days previously, and on the day before his admission was playing about the house. The only thing she noticed—and it was this which led her to bring him to the hospital—was that he had become swollen all over the body. The swelling first appeared in his face. When admitted he presented the typical appearances of a case of acute Bright's disease. He was extensively anasarcous; and there was some ground for believing that fluid existed in the peritoneal sac. He passed only four ounces of urine during the first twenty-four hours he was in the hospital, and the specific gravity of the fluid could not be ascertained. It was muddy rather than high-coloured, and when boiled proved to be exceptionally albuminous, the coagulum filling three-fourths of the bulk of the urine. Under the microscope it showed an immense number of uric acid crystals. His temperature was rather high, exceeding 104°. He had a little cough, not much, and no special hurry of breathing, save that on one occasion, when put into a warm bath, his breathing rose to 76. He was recognised as a child that had been in the hospital ten months before under the care of Dr. Beatty for acute Bright's disease; and the record showed that before he left the hospital at that time his urine was entirely free

from albumen. The students who saw him recollected his appearance, and that he was swollen then, but not to the same extent as the last time. He only lived three days after his admission. The *post mortem* showed a great deal of anasarcous fluid and some pleuritic fluid. The kidneys, instead of being bloody and congested, were pale, with the exception of a slight zone of congestion at the base of the pyramids. On the thorax being opened it was found that he had suffered from acute croupous pneumonia, which was not discovered during life. When the specimen was recent it was an exceedingly beautiful specimen of what Dr. Wilkes has well described as an inflammation which is capable, in a few days, of converting the spongy texture of the lungs into a structure like cheese. Even now the upper lobe of the right lung presents the typical appearances of true croupous pneumonia; but we found what does not so frequently exist in such cases—namely, three centres of pneumonic process, one in the middle lobe, and two in the lower lobe of the same lung. The kidneys were microscopically examined by Dr. Bewley, who found the convoluted tubules almost completely choked by swollen epithelium and albuminous material. It is difficult even in the light of the *post mortem* to read the case. The impression on my mind after the *post mortem* examination is that it was acute pneumonia occurring in a patient who had previously been the subject of chronic Bright's disease; because it has been my experience that when pneumonia attacks a person who has previously been the subject of chronic Bright's disease it is rapidly fatal. The microscopic appearances found by Dr Bewley hardly accorded with the existence of chronic Bright's disease. On the other hand, it is very difficult to understand why a child could become so extremely anasarcous as this child was from acute Bright's disease, and have kidneys which, instead of being bloody and dripping, are much paler than kidneys usually are after death in cases of acute Bright's disease. While the boy was alive I examined his chest on two or three occasions in search of pleural effusion; but, finding no sign of it in the lower part of the lung, I did not examine the upper portion. The boy's decubitus was invariably on the back, with a slight turn towards the right side.

SECONDARY CANCER OF THE LUNG.

By G. P. L'E. NUGENT, M.D.; F.K.Q.C.P.;
Physician Richmond, Whitworth, and Hardwicke Hospitals; Demonstrator of Anatomy School of Physic, Trinity College.

[Read in the Section of Pathology, May 4, 1888.]

T. K., aged twenty-six, a metropolitan policeman, was admitted into the Whitworth Hospital on Feb. 8, 1888.

On admission he complained of great weakness, slight pain between the shoulders and lower part of the abdomen. He had a wasted, haggard, and anxious expression, and was sweating profusely. His temperature was normal, and pulse slightly accelerated. He had a slight cough, of which he did not complain, and a very scanty frothy expectoration. The respirations were not appreciably hurried.

On examination of his chest, very few physical signs could be discovered. A slight degree of dulness existed posteriorly over the bases, and fine râles could be heard over the lungs generally. The chest expanded well on deep inspiration without producing a cough, and there was no difference between the two sides as regards vocal fremitus and resonance.

A few days after admission his right testis was found to be hard, slightly nodular, of about equal size with the other, without any adhesion of the skin.

He remained in much the same condition for over a week, being greatly troubled by obstinate constipation. Enemata brought away a large quantity of scybalous masses, but this gave no relief to the steadily increasing pain in the lower part of the abdomen. The belly was retracted and tender on pressure, and the muscles rigid.

On Feb. 23rd he was troubled with vomiting of a green fluid, which continued for some days. Hiccough was also present from time to time.

On the 26th he complained of great pain over his heart, and distressing palpitation, his pulse at this time being 130.

These symptoms moderated in a few days; but the pain in his abdomen had by this time become so intense as to be almost unbearable. The sweating continued to be most profuse, occurring by night and day, and increased by the paroxysms of pain. He occasionally complained of a slight pain in the right testis. His temperature during his illness never exceeded 99° in the evening, and was normal or sub-normal in the morning.

His expectoration became abundant towards the close, but was always frothy and never bloody. He never complained of dyspnœa. Shortly before his death, however, his respirations were hurried, and loud bubbling râles could be heard over both lungs. He died of asthenia on March 22nd.

The patient's family history was good, and he never had had any serious illness himself. He noticed the hard lump in his testis about three months prior to admission, and began to feel generally unwell at the same time. He remained on duty till one month before admission.

Autopsy.—On raising the sternum a small quantity of clear fluid escaped, and a large mediastinal gland had to be detached from the bone.

The right lung was perfectly free and easily removed, but the left had some pleuritic adhesions, notably at the apex, and there was a small quantity of clear fluid in both pleural cavities. Both lungs were covered over in all parts with innumerable nodular masses, varying in size from that of a walnut to that of a pin's head, more or less round in shape, projecting externally and into the lung, covered over with a perfectly smooth layer of pleura. The nodules were yellowish-white on section, and were of rather a soft consistence. The lungs internally were congested and œdematous. The mediastinal glands were much enlarged, and the weight of the lungs, heart, and glands collectively was 177 ozs.

The glands on left side of neck were enlarged and softened in centre.

The liver was enlarged, 84 ozs.; pale in colour.

Right kidney, 6 oz. in weight; pale. Left, normal.

Spleen normal.

Stomach and peritoneum free from disease.

The abdominal glands greatly enlarged, particularly along the course of aorta; some over-lapping it, and one, particularly large, lying on the inferior vena cava, at the level of the third lumbar vertebra.

Of the testicles, the left was normal, but the right was hard and heavy, slightly nodular, but little increased in size.

Microscopical sections (exhibited) showed the disease to be carcinomatous.

PULMONARY ARTERY WITH TWO VALVES.

By ARTHUR WYNNE FOOT, M.D., F.K.Q.C.P.;
Physician to the Meath Hospital;
Professor of Medicine, Royal College of Surgeons.

[Read in the Section of Pathology, May 4, 1888.]

I wish to lay before the Academy the heart of a man, aged fifty-nine, which presents the very rare anomaly of two sigmoid valves in the pulmonary artery. Inasmuch as the heart exhibited other pathological features it is not assumed or pretended that the deformity in question had anything to do with the man's death. He had long suffered from incompetence of the aortic valves, and from a great degree of calcification of the ascending portion of the arch of the aorta; the left ventricle was very much hypertrophied. The immediate cause of death was a sudden attack of diffuse bronchitis, to which he succumbed after a few days' illness, on the occasion of his admission for the third time to the Meath Hospital. On his two previous visits he had presented in a marked degree the physical signs of aortic regurgitation.

The pulmonary artery had been happily opened in the line of junction of the two valves which were of equal size, both of them much broader and deeper than usual, and of such dimensions that the pair were as competent to close the orifice of the artery as three of the usual size would have been. From the absence of hypertrophy of the right ventricle it would also appear that the want of the third valve had not given rise to regurgitation. The corpora Arantii were small, but the slight thickenings which, between the fingers, could be felt in their situations, were each placed mesially in the free edge of the valves; there was no trace of a ridge on the pulmonary side of the valve, nor of a raphe visible when the valve segments were held against the light, nor of a rudimentary septum at the bottom of the pouches. These points

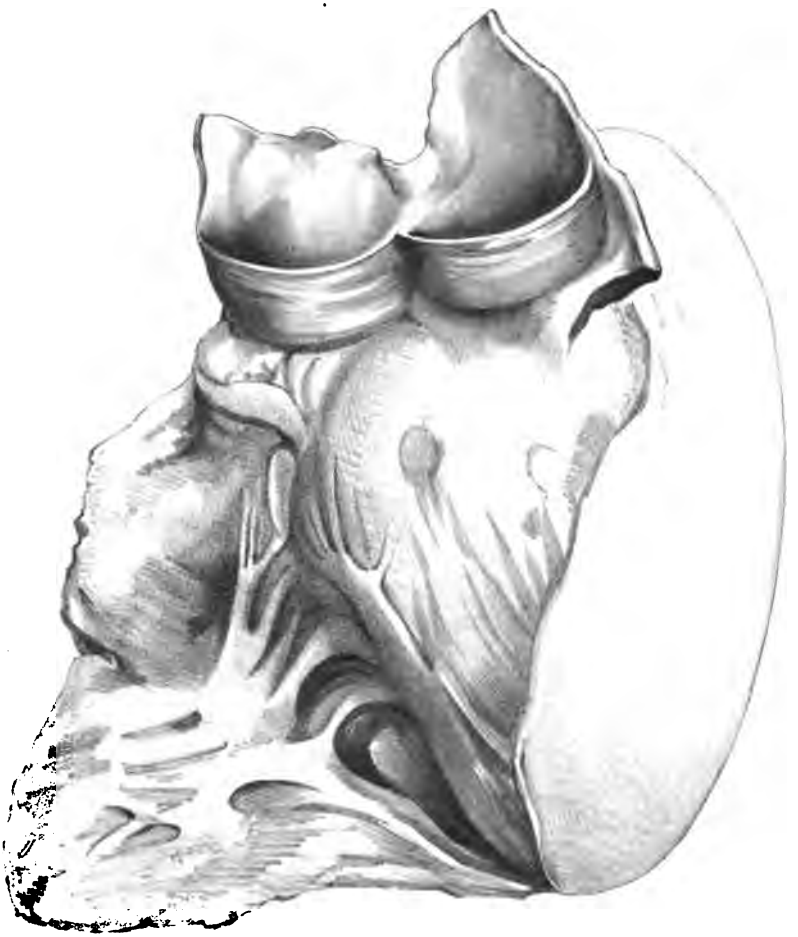
are of importance to attend to in reference to the question of congenital or acquired malformation.

The man from whom the heart was taken had enjoyed good health till about four years before his death. He entered the army at seventeen, and served in it for twenty-one years; he never had rheumatism, nor had he received any strain about the chest other than that incidental to the accoutrements in use when he joined the service.

By a strange coincidence the only other case of a similar formation which I can find recorded in Ireland was one which was met with by Graves, in the Meath Hospital, in the year 1841. It is mentioned in his "Clinical Lectures," Vol. II., p. 180, and an earlier account of it is to be found in the *Dublin Medical Journal*, Vol. XX., p. 409. It was met with in a man, aged sixty-six, who died with pneumonia, pericardial effusion, and endocarditis of the pulmonary valves—which proved to be but two in number. Speaking of his case, Graves observes—"The present is, as far as I can ascertain, the only specimen in which this peculiarity has been observed." In 1851 Dr. Peacock collected statistics upon the malformations of the aortic and pulmonary valves. He found that among forty-one cases of *defect* in the number of the valves, in nine the malformation existed at the pulmonic orifice, and in thirty-two at the aortic.

It has been suggested that the existence of two in place of three valves, in either the pulmonary artery or the aorta, is due to disease and not to congenital malformation, the disease being so situated as to separate from the wall of the artery the conterminous attachments of two valves, which then, when thrown into one, constitute a single deformed valve, the result of the union of the two segments. Lapse of time would tend to obliterate the traces of the initial disease.

I am led to believe that in the present case we have to do with a congenital formation, from the equality in size of the valves, the mesial position of the corpora Arantii, the absence of any ridge on the arterial side of the valve, or of any rudimentary frenum at the bottom of the valve pocket.



Dr. Foot: Pulmonary Artery with two Valves.

F. Huth, Lith.r Edin.r

The research which this case led to enables me to affirm two propositions, viz.:—(1) That numerical irregularities in the semilunar valves are more often observed in the aorta than in the pulmonary artery; and (2) that defect in the number of valve segments is more rare than excess.

It should be observed that in this case there was no other malformation in the heart, for Dr. Peacock has pointed out (*Path. Soc. Trans.*, Lond., Vol. III., p. 294) that defect in the number of the pneumonic valves is generally attended with other serious malformations which interfere with the natural development of other parts of the heart, and consequently, from the tendency to early death, is usually found in young persons.

PERFORATIVE PERITONITIS.

By J. S. M'ARDLE, F.R.C.S.;
Surgeon and Lecturer on Surgery, St. Vincent's Hospital; late Senior Demonstrator of Anatomy, Catholic University Medical School.

[Read in the Section of Pathology, June 1, 1888.]

WITHIN the past few years I have had much to do with peritoneal troubles arising in the course of surgical affections. The more I see of them the more firmly am I convinced that the fatal forms, especially suppurative and perforative, are still little understood. It is only in recent times that these affections, hopeless in the hands of the physician, have been received into the surgical fold. Already there are on record many cases which demonstrate the wisdom of what some sneeringly term the "laparotomy epidemic." Many and valuable lives have been saved by timely surgical interference in instances of grave peritoneal disease, which, in the hands of our critics, could not possibly have ended favourably.

This revolution in the results of treatment has led me to watch with more than ordinary care the symptoms which precede death in all the fatal cases of perforative and suppurative peritonitis which came under my observation, and to examine as soon as possible after death the organs most likely to be affected. This I did in the hope of determining with some degree of certainty the cause of the very high mortality which attends these lesions. I have selected two out of eleven cases of perforative and suppurative peritonitis. Of the eleven cases seven died. In the four which recovered, laparotomy was performed. In four of the fatal cases laparotomy was performed; in one, a resection of a perforated spot; in a second, suture without resection; in a third, fœtid pus had accumulated in pelvis, but a great extent of the small intestine was in a semi-gangrenous condition, while the fourth had diffuse cancerous disease of the mesentery, and perforation at the mesen-

teric border of the last coil of the ileum. One of the two in which there was no operation I record below, as also the case of suture without resection.

CASE I.—*Perforation of Vermiform Appendix Cæci.*—Joseph O'K., aged thirteen years, came under my care on November 12th, 1887, when the following note was taken by my friend, Mr. Hickey:—Family history good; he himself has had no illness before present one, which commenced as follows:—On November 6th he received a kick on the right side of the abdomen. This did not cause him much uneasiness until the 9th, when he complained of pain in the right inguinal region, for which he got a purgative draught, causing a slight evacuation of the bowels, but much increased the pain, which became paroxysmal in character. Vomiting set in on the 10th, and continued until the night after the 12th, when, on admission to St. Vincent's, he was found in the following condition:—Pulse weak, 120; temperature, 103°; face drawn and anxious-looking. He lay on his back with his legs drawn up, so as to relax abdominal muscles. Respiration shallow and entirely thoracic; abdomen distended and tympanitic; liver dulness present; movements of intestine visible through abdominal wall, which is very tender on pressure, especially over right iliac fossa, where, as well as at umbilicus, he has very severe paroxysmal pain. There was slight dulness over right iliac fossa, extending towards middle line over edge of true pelvis. On digital examination through the rectum the pelvis was found filled with coils of small intestine, and pressure upwards, backwards, and towards right sacro-iliac synchondrosis caused pain, such as the patient experienced during the exacerbations which occurred every ten or fifteen minutes. An indistinct tumour could be felt through abdominal wall at dull area.

Opium was administered, ¼-grain every 4th hour. Nutrient enemata every 6th hour, each containing half an ounce of brandy; yolks of two eggs; two drachms of liq. pancreaticus; two ounces of beef-tea, and three grains of quinia; and an ointment of belladonna and glycerine was applied over abdomen.

13th.—Patient had a very quiet night; slept well; tenderness much less. Pulse, 99; temp., 101·2°.

14th, 9 a.m.—Strength increased; breathing better; tenderness absent. Pulse, 98, regular and full; temp., 103°. During the 13th and through the night had iced milk and small amount of iced beef-tea, which were not rejected.

At 9 p.m. he complained of sudden pain in right iliac fossa; this was followed by collapse; pulse imperceptible at wrist; cold clammy perspiration over face; great distension of abdomen; liver dulness absent; breath became extremely offensive; skin appears like damp wash leather.

15th, 2 a.m.—Still in a state of collapse, unconscious; pulse just perceptible at wrist, but cannot be counted; temp., 97°; vomiting of very fœtid material, during which occurrence there is no complaint of pain.

4 a.m.—Vomiting again takes place; the lower bowel is evacuated, and some convulsive movements occur. Consciousness does not return, and the patient dies at 4 30 a.m.

The *post mortem*, four and a half hours after death, reveals a peritoneum filled with a gas so fœtid that it is impossible to come near the body for some considerable time after opening it. There is very little evidence of peritonitis except at the junction of the ileum and cæcum, and there is a gangrenous and perforated spot in the vermiform appendix. A collection of very fœtid pus is found in the true pelvis and in the dilated end of the appendix, which contains an olive-shaped calculus.

Now, here is a case in which, until 8 o'clock in the evening preceding death, the patient's pulse, temperature, and general condition, had manifestly improved under opium, quinia, and rectal nourishment. Suddenly perforation occurs, his pulse disappears; from being slightly flushed his face becomes ashy pale, cold and clammy; his eyes deeply sunken, and surrounded by dark areolæ; the temperature goes down, profound collapse is established, and he dies seven hours after the occurrence of perforation. A peculiar and penetrating fœtor is present during the last hours, as if a general disintegration had already set in even in the presence of all the unmeasured forces which constitute what we call life.

The second case is one of gastric perforation.

Case II.—The patient, a housemaid, Margaret D., aged twenty-two years, came under my care on the 1st of March, 1888. For two years she had suffered from symptoms of gastric ulcer. The present attack commenced as follows:—For some days she suffered from abdominal pain, which became very severe at 5 o'clock on the evening before admission. She took a purgative draught, which

she vomited about 6 o'clock. At 8 p.m. vomiting again occurred—this time the vomited matter was streaked with blood. At 3 a.m. of the 1st of March the vomiting became very troublesome, and severe pain was felt in the left hypochondriac region. A purgative enema was now given her. Extreme pain followed a free evacuation of the bowels; vomiting continued, and at 5 a.m. she felt a sudden increase of the pain, and became cold, clammy, and pulseless. This state of collapse continued until her admission at 12 noon of March 1st, when her condition was as follows:—Pulse very rapid, irregular, and at times imperceptible. Temp. 101·4°; face pale, drawn, and anxious-looking; eyes sunken; pupils dilated; tongue red, dry, and hard. She complained of severe pain at cartilages of 8th, 9th, and 10th ribs, and of rather less pain in left lumbar region. She also had severe pain passing from the middle of each clavicle, across the shoulder and up to nape of neck. The abdomen was distended and tympanitic, slightly tender on pressure, especially in left lumbar region, over which there was a well-marked area of dulness.

Diagnosis.—Perforation of anterior wall of stomach, with extravasation of contents; peritonitis most severe on under surface of diaphragm, affecting both phrenics, and thus producing clavicular pain.

Treatment.—She was placed in recumbent posture, with hot jars at her feet and sides. An ointment of opium, belladonna, and glycerine was gently smeared over abdomen and covered with spongiopiline. A nutrient enema was given every 4th hour, and ¼-grain injections of morphin every 3rd hour. She was kept perfectly quiet, and allowed occasionally small pellets of ice to allay the great thirst she complained of. Under this treatment she rallied, became quite conscious, vomiting ceased, and her pulse came down to 100 per minute; temperature, 105·5°. The urine, which was normal, had to be taken away by catheter.

2nd.—Had a good night, slept five hours; tympanites greater; liver dulness quite absent; dulness and fluctuation in both loins; tenderness over entire abdomen; temperature, 101·5°; pulse, 140. During the day the pain increased, and vomiting set in; the pulse became weak, the breath fœtid, the urine dark, having a peculiar sickening and ammoniacal odour. At 6 p.m. the temperature fell; patient had shivering; pulse became quick and almost imperceptible; cold perspiration broke out all over body. Believing that septic absorption was the cause of these unfavourable changes, I

performed laparotomy, washed out peritoneum, and sutured a perforation in the anterior wall of the stomach within an inch and a half of the cardiac orifice.

Notwithstanding a lengthy operation she rapidly recovered from the effects of the anæsthetic, and in one hour afterwards her pulse was better than at any time since perforation occurred. Three hours later collapse set in, and she died of exhaustion early on the morning of the 3rd.

The expectant method of treatment had allowed the entire peritoneum to become actively engaged in the absorption of the deleterious products of disease, and death was already rapidly approaching when the operation was undertaken.

I now exhibit the vermiform appendix cæci removed from Case I., and a small calculus which had formed therein and led to its dilatation and perforation.

I also desire to call attention to the stomach removed from Case II. The cicatrix of an old ulcer is found on the posterior wall; its contraction has led to the production of an hour-glass appearance such as was present in a case brought before this Section of the Academy by Dr. Finny. The perforated spot is firmly sutured, and corresponds to the centre of an irregular ulcer on the anterior wall of the stomach.

Although the foregoing cases are only instances of intestinal perforation resembling in most particulars those of everyday occurrence, I would direct attention to the symptoms which attended them, with the object of eliciting an expression of opinion as to the pathological processes which brought about a fatal result.

When we compare the cases we find that the patient with perforation of the stomach lived three days, while in the other death occurred in seven hours after perforation. In the stomach case, symptoms of collapse disappeared before those of blood infection became marked; in the other collapse became more profound until the end. In both, the fœtid and ammoniacal odour which attends septic intoxication was present, but in the stomach case not until sixty-two hours after perforation, while in the other it developed in

three hours. In the former the semi-solid and liquid contents of the stomach entered the peritoneum in large amount; in the latter only gas and a little liquid escaped through a small opening. The stomach case seemed to me one of uncomplicated septic poisoning. The other was attended by a prostration which can only be accounted for by peritoneal absorption of some material capable of profoundly influencing the heart and central nervous system. What this material is, how this material exerts its influence, are the questions which I desire with your permission to discuss.

To enter into a chemical study of the intestinal contents is not my intention. Clinical observation has led me to believe that there is a marked resemblance in the symptoms attending intestinal obstruction, perforative peritonitis, and poisoning by putrid animal matter, and, although each will have its own characteristic symptoms, running through all will be changes which cannot be accounted for by the varying conditions found after death in the solid tissues of the body. Our search must therefore be pushed to its liquid and gaseous constituents and contents.

The intestinal contents prior to perforation must first engage our attention; next the influence of each when introduced into the blood, and last the effects of their intra-peritoneal injection. Especially in obstruction the small, and to a greater extent the large, intestine contains, as well as harmless portions of injesta—

1st. Innumerable putrefactive micro-organisms, and the products of their action.

2nd. The products of inflammation—sepsin, &c.

3rd. Gases, especially hydro-sulphuric.

When perforation occurs these substances enter the peritoneal sac, and on their entry begins the chain of symptoms which end in death.

Now, in cases of rapid death after perforation there is no marked change in the peritoneum, and if called upon to examine that membrane, even microscopically, you could find therein no marked evidence of inflammation, and certainly no cause for a fatal result. We must, therefore, endeavour to discover the influence of each of these apparently active agents when introduced into the blood

and into the peritoneum; then, by a comparison of clinical experience with experimental results, draw conclusions as to cause of death in the cases before us.

Septic and putrefactive micro-organisms, when introduced without the products of their action, are harmless so long as the tissues are healthy—in fact, they undergo disintegration. This holds good in intra-venous injection according to Klein, and in intra-peritoneal according to Grawitz.

The injection of putrescent animal matter into the blood is followed by collapse, cold clammy perspiration, early cardiac failure, with disappearance of heart sounds.

When introduced into the peritoneum, if in small amount, absorption takes place without harm; if in large amount, after some hours a rise of temperature, followed by shivering, purging, collapse, and death in eighteen to twenty-four hours.

If sepsin be introduced into the blood, it produces febrile symptoms, vomiting, shivering, torpor, spasms, collapse and death. When placed in the peritoneum no immediate change takes place, but in a few hours the animal becomes drowsy and feverish, in from six to ten hours cold and bathed in perspiration, and, if a large amount has been used, collapse sets in, followed by death.

In the experiments of Bernard, injection of hydro-sulphuric acid into the veins produced profound collapse, which came on in a few minutes and lasted four to six hours. At the end of this time the breath was fœtid, stained lead paper black, and the urine contained H_2S. When injected into the peritoneum in small amount, prostration occurs in from ten to fifteen minutes, and lasts for a few hours; when in large amount, collapse is early and may be kept up until death occurs.

In Emminghaus's cases of perforative peritonitis, in which early and extreme prostration occurred, the urine contained H_2S, and later the same gas was eliminated from the lungs.

From the above it would seem that while none of the substances can of themselves set up all the symptoms, a combination of them is capable of producing all the various symptoms which attend cases of perforative peritonitis.

The initial collapse of gastric perforation may be accounted for by shock, the subsequent gradual sinking being usually due to septic absorption.

The early and prolonged prostration of intestinal perforation, especially when low down, may be accounted for by absorption of H_2S, accompanied by shock, the fatal issue being of septic origin.

In both, when the intestine is overloaded, the products of putrefaction may come into play, and add the symptom of early cardiac failure.

Now, if I am correct in the views above put forward, they teach a lesson of which modern surgery has already commenced the study—that is, that the cause of death is removable in those apparently hopeless cases.

Up to this, my case included, there are on record 26 cases of laparotomy for ulcerative perforation of the stomach or intestines.

The result of 22 are given by Steinthal (*Verhand. deutsch. Gesell. für Chir.*, 1888). Eight of the 22 recovered. In only 1 of these was suture required; in 1 the appendix cæci was removed; in 8 suppurative peritonitis was present; in the others septic peritonitis existed. Incision and washing out of the peritoneum saved these cases even under such unfavourable circumstances. In the unsuccessful cases the operation was, as in my case, too long delayed, the perforation could not be detected, or secondary collapse occurred. Of the remaining cases, 1 recovered completely, a second with a fæcal fistula, 2 died within twenty-four hours after operation. These results would strongly support the views put forward in my communication, and should impress us with the necessity of early operative interference in such cases.

PYÆMIA OF DENTAL ORIGIN.

By ARTHUR W. W. BAKER, M.D., F.R.C.S.;
Surgeon to the Dental Hospital of Ireland.

[Read in the Section of Pathology, June 1, 1888.]

As pyæmia from dental causes is not very common, or perhaps has not been frequently recognised, the notes of a case which came under my own observation are, I think, deserving of record. Before, however, detailing my own case, I shall refer to some of the scanty literature of the subject.

In the recent edition of Tomes' "Dental Surgery" the author refers to seven cases of acute and chronic pyæmia of dental origin, which he has collected from various sources, all of which proved fatal. Two of these, however, in my opinion, were, strictly speaking, not pyæmic, as we now understand the term. In one, extension of an abscess connected with a lower wisdom tooth produced some severe unilateral glossitis, and mechanically suffocated the patient. In the other, splintering of the lower jaw in the removal of a tooth gave rise to an abscess which found its way up the ramus and through the foramina ovale, rotundum, and spinosum, into the cavity of the cranium, where meningitis ensued, of which the patient died. The remaining five cases may fairly be classed as pyæmic, and as such deserve our attention, for they point to the fact that alveolar suppuration cannot always be treated as an affection of no moment, but may sometimes be attended with even fatal consequences. Unfortunately, details are wanting in the cases recorded by Mr. Tomes, upon which we might with advantage generalise.

Dr. R. J. Porre, at the International Medical Congress held at Washington in 1887, brought forward some cases of chronic pyæmia of dental origin, in all of which there was, fortunately, a happier

termination than in those recorded by Mr. Tomes. Dr. Porre gives the following account of one of the cases observed by him:—The patient, male, good constitution and habits, suffered for the last thirty years from neuralgia, besides having constantly recurring furuncles and eruptions in various parts of the body, which would often for months become running abscesses. He experienced burning and itching eruptions of hands and feet, which would finally change to stubborn ulcerations. His bowels were either stubbornly constipated or exhaustingly loose. He suffered from frequent rigors and febrile attacks of varying intensity, profuse night sweats, retention of urine, serious constrictions of the bowels and urethra. Lancinating pains darted from the maxilla of right side to bowels, bladder, limbs, hands and feet, or to whatever part was locally affected at the time. This latter peculiarity, together with the discovery of a little pus exuding from the locality of the wisdom tooth, led to a final correct diagnosis of his case. The tooth referred to was extracted, and a speedy and complete recovery followed. Dr. Porre also read the notes of ten similar cases, which all yielded to the simple remedy of removing the offending tooth.

Mr. Frederick Eve, Curator of the Royal College of Surgeons, England, in a recent communication to the Odontological Society, whilst noticing the fact that in periodontal abscess, although the pus directly gained access to the bone, serious consequences rarely followed—yet related the case of a young man who had been troubled by an abscess in the region of the fangs of a second molar tooth. He attended the funeral of his grandfather, caught cold in the tooth, and died in three weeks of pyæmia.

Some interesting experiments on mice are at present being carried out by Dr. W. D. Miller, of Berlin, by inoculating them with the material obtained from gangrenous pulps. As these experiments are not yet concluded, it would be premature to do more than allude to them here; but from Dr. Miller's recent communication to the *Dental Cosmos*, he is evidently quite alive to the importance of investigating this source of pyæmia.

The following case occurred in my own practice. I am happy

to say that it was not fatal, and that I succeeded in curing the patient without sacrificing the offending tooth:—

CASE.—Mrs. ——, aged thirty-three, widow, consulted me in the beginning of November, 1887, about her first left upper molar tooth, which had given her pain from time to time. The patient appeared to be in excellent health, and presented no evidence of constitutional taint. She stated that the only illness she had had, excepting, of course, her confinements, was a severe attack of scarlatina at twelve years of age, which was followed by general dropsy. At the age of nineteen, the first left upper molar (the tooth about which she consulted me) was filled; this resulted in an alveolar abscess over the tooth. Ten years later she had another rather acute abscess in the same place, which was followed at once by a small abscess on the fourth toe of the right side; then small abscesses broke out over other parts of the body, the tooth, at the same time, being the seat of more or less uneasiness. Early in the spring of 1887, she suffered from an abscess in the right ear, which by the medical attendant was thought to be connected with some tooth. About a week previous to consulting me, she had a recurrence of the abscess over the left upper molar; this was followed by a small pimple on the back of the right forearm, which at the time of her visit presented the appearances of a small pyæmic abscess. Viewing the case as one of chronic pyæmia, having its origin in the suppuration about the roots of the molar, I decided to try and save the tooth, and in so doing, if possible, to cure the pyæmia.

The tooth I treated by removing all that remained of the dead and decomposed pulp, cleaning out the roots thoroughly, syringing them first with weak carbolic lotion, then with absolute alcohol. The roots were finally dried with hot air and injected with a solution of iodoform in ether, and the filling of the tooth was completed at a subsequent sitting. There was a swelling, about the size of a small marble, on the gum over the buccal roots of the tooth, corresponding to the site of the alveolar abscess to which I have alluded; this I laid open freely, and allowed it to heal from the bottom. The fluid which escaped from this swelling was more like cystic fluid, such as is frequently found as the result of chronic inflammation round the roots of teeth, than true pus.

It is now more than six months since I treated this case, and being interested as to the result, I have kept the patient under observation. She has had no further trouble with the tooth,

and the metastatic abscesses have ceased. That the tooth was the source of the poison, to my mind, appears extremely probable, both from the frequency with which the periodontal abscess was succeeded by an abscess elsewhere, and the fact that the small abscess, which was situated on the patient's forearm when she came to me, subsided more rapidly than any previous abscess on treatment of the tooth; and no abscess has since then appeared.

I am not quite clear as to the explanation of why the pyæmia evidenced itself always on the right side, while its dental origin was on the left. That more serious symptoms did not present themselves in this case was most likely due, as pointed out by Mr. Watson Cheyne in his recent lectures on "Suppuration and Septic Diseases," to the small dose of the poison.

The history of this case, taken in conjunction with the others which I have quoted, shows the importance of investigating the condition of the mouth in any case of pyæmia where we are in doubt as to the source of the disease.

LOCOMOTOR ATAXY.

By J. MAGEE FINNY, M.D., Dubl.; F.K.Q.C.P.;
King's Professor of Practice of Medicine; Physician to Sir Patrick Dun's Hospital.

[Read in the Section of Pathology, June 1, 1888.]

The morbid specimens of the spinal cord under the microscopes were taken from a patient, Mr. M., aged thirty-eight, who died in my hospital in April, 1885, of emphysema and cardiac dropsy.

In 1879 he was first under my care, in the City of Dublin Hospital, for asthma and bronchitis, with an enlarged liver. His bed adjoined that of a patient suffering from locomotor ataxy, and to whose symptoms I had directed the attention of my clinical class.

Three years subsequently Mr. M. called on me, saying he had locomotor ataxy, and that he knew, by my clinical lectures on the disease in 1879, he was even then a victim of the disease, as, for nine years before that, he had had a tendency to fall backwards on standing with the eyes closed, or in attempting to look up to the roof of an adjoining house, and for five years he could not walk with any certainty in the dark.

I made a careful examination of him at the time I refer to, and found he had sufficiently well-marked symptoms to confirm his opinion that he really had tabes.

I lost sight of him from 1882 to 1885, when he again visited me in my house, and his condition, as regards the cardiac dropsy, enlarged liver, and the asthma, was so bad that I admitted him into the pay ward of Sir Patrick Dun's Hospital. Here he made a rally for a while, but finally died asphyxiated, ten days after admission, the bronchial tubes being quite blocked with copious effusion of serum and mucus.

The *tabetic* history and symptoms are as follows:—From boyhood Mr. M. indulged in excesses of sexual and debauched habits,

fostered largely by the kind of life he lived, being one of excitement, associated with betting and the turf.

As a boy he masturbated; at the age of eighteen he contracted the venereal disease (? syphilis), and, in spite of constant and frequent coitus, he had nocturnal emissions every third night. When twenty-six, he acquired the habit of nipping, and since then he has been a regular drinker of whisky, sometimes to the amount of fifteen half-glasses a day, and was rarely sober at bedtime. Of late the sexual appetite has not been inordinate, and erection and seminal emissions have occurred only under excitement. There is not, nor ever has been, any loss of control over the bladder or rectum.

Special Symptoms—(*a*) *Reflexes.*—The irides are contracted somewhat, and do not react to the stimulus of light, though they do to accommodation (Argyll-Robertson's phenomenon). The patellar reflexes are absent.

(*b*) *Paræsthesia.*—Tactile sensation is much diminished in the arms and legs. When in bed, he is not aware of the position of his feet unless he strikes them against the footboard. He is also ignorant of the position of his right arm when it is outside the bedclothes, and he has much difficulty in using the fingers for such matters as buttoning his clothes, using a pin, &c. He says, in relation to this point, that a couple of years ago he transfixed the skin of the left forearm when pinning on a cuff, and he was made aware of this for the first time when, finding the cuff fixed, he drew it down forcibly, and tore the pin through the skin of his wrist. He states—but of this I have no confirmation—that the temperature of the skin of his fingers of the right hand at times rises high—higher than that of the left—so that in wetting them "they steam!"

The neuralgic or lightning pains, so usual in tabes, are remarkably slight, although he states he has had occasionally rheumatic or neuralgic pains in his arms and legs. There is also an absence of "girdle sensations" and of gastric crises, for although vomiting has not been an uncommon event, it was probably attributable to alcoholic excess.

(*c*) *Ataxic Symptoms.*—These are fairly well marked. The patient has difficulty in maintaining his position when his eyes are shut, and he staggers in his gait unless he fixes his eye on an object before him, or on the ground. When turning round, there is a great tendency to fall. His gait is, however, more that of feebleness and want of confidence than that of a pronounced tabetic, as there is little or none of the "high knee action," and the forcible throwing out and then the bringing down of the heel, which are commonly present in tabes.

There is very little muscular wasting, but the dropsy of the lower extremities probably masks it somewhat.

Post-mortem Examination.—The spinal cord was removed the day following his death, and sections were kindly made by Dr. Henry T. Bewley, to whom I am also indebted for the accompanying drawings.

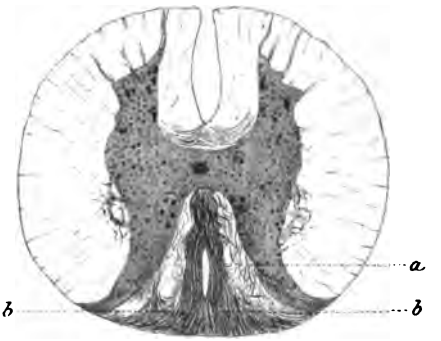
There was considerable inflammatory thickening and matting together of the spinal membranes, more particularly over its posterior aspect on the lower dorsal and the lumbar regions. In making the section after hardening, the pia mater tore away in many places, but its thickened nature and increased fibrous prolongations into the substance of the cord can be well seen in many of the sections. The cord itself was neither flattened nor atrophied to the naked eye.

Examination of the sections shows that the sclerotic change is fairly symmetrically disposed, but that its chief seat is in the cervical region rather than in the lumbar—a pathological confirmation of the surmise made during life, and based upon the clinical fact that the arms were more affected than the legs.

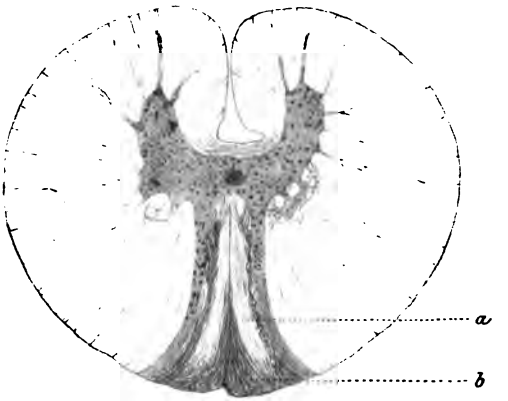
Where most pronounced, the sclerosis has produced complete atrophy of the nerve fibres.

In the cervical region the postero-external columns (*a*) are greatly degenerated—very slightly in the dorsal and moderately so in the lumbar. On the other hand, the postero-median columns (*b*) are much involved in the lumbar, and proportionately less so in the dorsal and cervical regions.

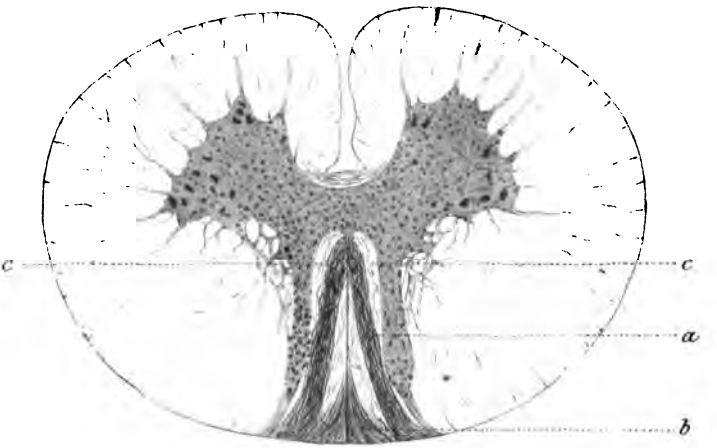
As may be expected, there is no evidence of secondary ascending spinal degeneration.



Lumbar Region.



Dorsal Region.



Cervical Region.

F Huth, Lith^r Edin^r

Dr J. M. Finny on Locomotor Ataxy.

There is in the section of the cervical portion a remarkable exemption from degenerative changes of the upper and outer parts of the posterior columns (*c*), so that bundles of healthy nerve fibres lie between the posterior grey cornua and the degenerated columns of Burdach. This appearance is very unusual, and is not met with in many of the published drawings of the disease. One very like it, but to a much less extent, is depicted by Dr. Gowers ("Diseases of the Nervous System," Vol. I., p. 310).

The grey matter of the posterior cornua show very slight involvement in the degenerative change.

In addition to the interest attaching to every case of tabes, I think my case is remarkable in three points—viz., firstly, the limited and moderate amount of sclerosis present, due, doubtless, to the patient's life being cut short by an intercurrent and independent disease, and thereby affording the opportunity of seeing the cord in an earlier stage of tabetic change than is usually met with; secondly, the localisation of the degeneration in the upper rather than in the lower part of the cord; and thirdly, the exemption from sclerosis of a considerable portion of the postero-external column in the cervical region.

EXPLANATION OF PLATE.

Sections of Spinal Cord affected with Locomotor Ataxy.

(*a*) = Postero-external columns (columns of Burdach)
(*b*) = Postero-internal columns.
(*c*) = Portion of posterior columns unaffected by sclerosis.

(A) *Lumbar Region.*—Dense sclerosis of postero-median columns and of the superficial part of postero-external columns. Slight sclerosis of rest of posterior columns.

(B) *Dorsal Region.*—Posterior third of postero-median columns and superficial zone of postero-external columns much affected. Slight sclerosis of rest of posterior columns.

(C) *Cervical Region.*—Dense sclerosis of entire posterior columns except anterior part of postero-external and middle portion of postero-median columns.

SEPARATION OF THE CORACOID EPIPHYSIS OF THE SCAPULA.

By E. H. BENNETT, M.D., Univ. Dubl., F.R.C.S.;
Professor of Surgery in the University of Dublin;
Surgeon to Sir P. Dun's Hospital.

[Read in the Section of Pathology, June 1, 1888.]

I HAVE used this term, coracoid epiphysis of the scapula, for convenience, well knowing that the independent centre of the coracoid is essentially different in its homology from the ordinary epiphyses, and that on this ground objection may be taken to its employment. In the pathological sense this specimen is an epiphysary separation, and agrees in its details with the lesion as we see it in the long bones. The cartilage uniting the coracoid to the scapula has separated from the latter, carrying with it in one part a small scale of bone; in other words, the line of separation is on the proximal side of the epiphysary cartilage, and any further secondary fracture of bone is seated in the diaphysis, as constantly occurs in the similar injuries of the long bones.

My object in bringing forward the specimen is to record its existence, for I have not found any record of a similar case. The following is the category of epiphysary separations admitted by Malgaigne as having been proved by dissection to exist:—"The epiphysary separations which have been attested by dissection are: 1st, of both extremities of the humerus; 2nd, of the inferior extremity of the radius; 3rd, of both extremities of the femur; 4th, of both extremities of the tibia." To this list we can add the epiphysis of the great trochanter, of the inferior extremity of the fibula and of the ulna. I have shown that the rarely-observed secondary centre of ossification of the astragalus may be detached, and I can now add to the list the detachment of the coracoid secondary centre.

M. Coulon, writing in 1861 specially on the lesions of childhood, quotes, without addition, the words of Malgaigne; and, as I have said, in no written record can I find any mention of the coracoid process being detached after the manner of epiphysary separations.

The intrinsic value of this observation is very small, but I give it for what it is worth:—

CASE.—J. C., a male, aged six, was admitted to Sir P. Dun's Hospital on 15th July, 1887, in a state of profound shock, pulseless but sensible. He had been knocked down by a tramcar, and was taken up from beneath its guard board. A large flap of skin, from about the mammary line in front to within an inch of the clavicle above, was torn up from his chest wall on the right side; a second rent of the skin extended backwards beneath the axilla from the point of the anterior wound; the axilla was torn open and the upper limb all but torn off; the axillary vessels were seen torn through, and most of the nerves. The right forearm was broken, and many of the ribs on the right side were broken. His condition precluded operation for some 48 hours, when gangrene of the whole limb had occurred. Amputation at the shoulder was then performed by my colleague, Dr. Ball, the only difficulty being the finding of sufficient covering for the stump. In face of all these difficulties the child did well until tetanus set in, and proved fatal on July 23rd.

At the autopsy the right ribs were found broken, from the 2nd to the 7th, completely, while the 8th and 9th were incompletely fractured. There was no injury of the lung or pleura. The coracoid process was found to be broken.

From the character of the wound, particularly that of the skin, it is clear the force which inflicted the injury of the axilla was directed from below and in front, upwards and backwards, and its action ceased a little below the clavicle, which was intact. The lesion of the coracoid confirms this view. It is detached at its base, the line of separation passing through the proximal side of the cartilage, and at the upper and back part taking off a scale of bone from the supra-spinous fossa of the scapula. By misadventure the ligament of the scapular notch was cut away in making the

early investigation of the injury, but the posterior margin of the notch bears incontestable proof of the quality of force that produced the lesion. A partial fracture of the scapular border behind the notch extends into the supra-spinous fossa for half an inch, and its anterior border has been sprung backwards, so that the thin layer of bone has overlapped the opposite side of the fracture and remains fixed in its displacement. This shows that the ligament of the notch attached in front to the base of the coracoid had all but torn off backwards with it a strip of bone from the superior border of the supra-spinous fossa.

As the base of the coracoid in its epiphysary condition forms a part of the glenoid cavity just at its summit and along the concave part of its upper and inner border, we find these parts detached and displaced with the coracoid; the upper and inner end of the cotyloid ligament is torn through, and with the base of the coracoid the attachment of the outer limb of the cotyloid ligament is displaced unbroken, and the tendon of the biceps along with it.

The section made by the amputation passed through the capsule below these points, and so left their relations as regards the fracture undisturbed. There is no lesion of the clavicle or any other part of the scapula, but it is of interest to note that the acromial epiphysis is joined to the spine by a diarthrodial joint.

This specimen is of particular interest, in so far as it completes the series of coracoid fractures in our collection, which contains already several specimens of the fractures associated with dislocation of the humerus, a specimen of fracture from muscular action, and fractures from direct injury in the adult—a list of injuries of this process probably exhaustive; in fact, we want only a gunshot fracture of the part to make our collection complete.

The fractures of the ribs in this case are of interest because of their occurrence at so early an age; but as I have already laid a similar case before the Academy, I need not delay to describe these specimens.

A CASE OF CIRRHOSIS OF THE LIVER, WITH THROMBOSIS OF THE PORTAL VEIN.

By HENRY T. BEWLEY, M.D.;
Assistant Physician and Pathologist to the Adelaide Hospital, Dublin.

[Read in the Section of Pathology, June 1, 1888.]

The man whose illness I am about to describe was admitted into the Adelaide Hospital on April 7th, 1888, under the care of Dr. Wallace Beatty, in whose unavoidable absence I bring the case forward.

He was aged sixty years. By profession he was an engraver. He had had chronic bronchitis for about twenty-five years, but otherwise was healthy till about the middle of March, 1888. He then noticed that he had piles, which he had not before suffered from. His feet began to swell; in a few days his abdomen began to swell too. This latter swelling soon became the most prominent feature of his disease.

About the beginning of April, 1888, he became jaundiced. During his illness he lost flesh considerably up to his admission to hospital.

When examined in hospital on April 8th, his abdomen was greatly distended with fluid, and measured 44 inches round. The superficial veins were prominent. His feet, legs, and thighs were very œdematous. He was jaundiced, bile showing itself in skin, conjunctiva, and urine. There was a faint mitral systolic murmur. Over the lungs some sonorous râles were heard. The abdominal viscera were examined, as fully as the ascites would allow; but no abnormality in the liver or tumour anywhere could be detected. He was very ill and weak.

In spite of treatment, the ascites increased, and caused much distress. Therefore, on May 12th, 1888, Dr. Beatty tapped the

abdomen, and drew off 18½ pints of fluid. This fluid was bright red, and contained a very large quantity of blood. When the abdomen was flaccid, a hard nodulated tumour was felt, extending from the right to the left hypochondriac region.

The patient felt much relieved by the tapping; but the fluid rapidly accumulated again. On May 18th, the belly was almost as distended as before the tapping. Weakness increased, and on May 21st—nine days after the tapping—the man died.

On making a *post-mortem* examination, we found about 2½ gallons of fluid in the peritoneal cavity. This fluid was just like that which had been withdrawn during life—it contained a great deal of blood; in the dependent parts of the peritoneal cavity there were several large and soft blood clots. The peritoneum itself was healthy. The liver was large, weighing 76 ounces. The left lobe and part of the right lobe showed the typical character of very advanced cirrhosis. It was this large hard nodulated liver that had been felt after the tapping, and that had been thought to be a tumour. The rest of the right lobe—about two-thirds of it—was quite different in appearance; it was bright yellow in colour (the other parts of the liver being brownish-green), and was very soft, breaking down into a pulp under the slightest pressure. This yellow soft mass was sharply marked off from the rest of the liver. The portal vein in the lesser omentum, as far as about one inch from its bifurcation, and its ramifications in the soft yellow part of the liver were filled with a soft clot, which did not all adhere to the walls of the vein. The vein itself, and its lining membrane, seemed healthy. This clot did not extend into the branches of the vein which went to the left lobe. Microscopic examination showed there was no necrosis, but only a great softening of the liver tissue. The peritoneum covering the liver was healthy.

There was some thickening of the posterior flap of the initial valve, which accounted for the systolic murmur heard during life. The lungs were emphysematous. The other organs were normal.

The remarkable points about this case are:—

1. The rapidity with which the symptoms came on and death ensued.

2. The presence of blood in the ascitic fluid.

3. The thrombosis of the portal vein and of some of its branches.

4. The great softening of the part of the liver in which the branches of the portal vein were filled with the thrombus.

The duration of the illness, dating from the first symptoms, was a little over two months. I do not at all consider that this time represents the duration of the cirrhosis of the liver: on the contrary, I think that the course of the disease must have been as follows:—

The cirrhosis began a long time ago, and gradually obstructed the portal circulation more and more; but without giving rise to any symptoms. At last the blood clotted in the branches of the portal vein which went to the right lobe of the liver and to a lesser extent in the trunk of the vein. This obstruction to the blood flow caused the ascites. The presence of blood in ascitic fluid in cases of cirrhosis of the liver or of thrombosis of the portal veins is very rare. There was no breach of surface from which the blood could have come—it must have exuded from the over-full capillaries of the peritoneum. The softening of the right lobe of the liver must have been due to the blood supply having been cut off. To the naked eye it appeared that the liver substance was in a state of necrosis; but with the microscope I could not find any morbid change except great softening. The bright yellow colour was probably due to the bile.

SECTION OF STATE MEDICINE.

THE MEDICO-LEGAL ASPECTS OF THE COACHFORD POISONING CASE.

By C. YELVERTON PEARSON, M.D., Q.U.I., F.R.C.S. Eng.;
Professor of Materia Medica and Lecturer on Medical Jurisprudence, Queen's College, Cork; Fellow of the Royal Academy of Medicine in Ireland.

[Read in the Section of State Medicine, February 3, 1888.]

Owing to the very deep interest which has been recently aroused in this country and elsewhere, both in the minds of the public in general and of the medical profession in particular, by an important criminal trial for wife-murder in which I happened to be engaged as the principal medical witness, I think it desirable to bring under the notice of the profession the chief scientific facts, together with such other points in the evidence as seem to me to be relevant to a consideration of the medico-legal aspects of the case. I also trust that the paper I now bring before you may serve the purpose of a permanent record, and consequently in order that it may become intelligible to those of my future readers who can have no other means of becoming acquainted with the history of the case in all its bearings, I have felt compelled to introduce many matters of evidence of a non-medical nature. I regret that in doing so the present article has assumed proportions far beyond either my original intention or desire.

The main facts of the case, which will probably be most familiar under the title of the "Cross case," are briefly these:—

History of the Case.—Mary Laura Cross, wife of Surgeon-Major Philip H. E. Cross, of Shandy Hall, Dripsey, in the County of Cork, died on the morning of June 2nd, 1887, and was buried at 6 30 on the morning of June 4th.

During her illness, which lasted about three weeks, she was attended chiefly by her husband, and was on only one occasion

seen by another medical man, nor had she any regular nurse, being left to the care of Mr. Cross's sister and the servants of the house. A few days after the funeral Mr. Cross went to England, and returned home on June 21st, and on the following day he paid a visit to the house of a Mrs. Caulfield, who, owing to a letter that she had just received, accused him of having, during his absence, got married to a Miss Skinner, who had formerly been in his employment as a governess. He denied the accusation and went away. He again left home on the 24th of June, and returned on the 26th, bringing with him Miss Skinner, as his acknowledged wife. Suspicion was aroused, and owing to evidence received by the authorities, the body of the late Mrs. Cross was exhumed. A *post-mortem* examination was made, which proved that death was not due, as had been certified by Mr. Cross, to typhoid fever, nor yet to heart disease, from which it was stated that she suffered, but indications of irritant poisoning were discovered. An analysis was made of the viscera, which disclosed the presence of arsenic in poisonous quantity, and also a small amount of strychnin. It also became known, from the evidence of a Miss Jefferson, that the symptoms presented by Mrs. Cross, during her late illness, corresponded with those of arsenical poisoning. Mr. Cross was arrested on the charge of murder, and was tried at the Munster Winter Assizes before Judge Murphy and a special jury. The trial, which commenced on the 15th of December, 1887, extended over four days. The prisoner was found guilty, and was sentenced to be hanged, and was accordingly executed on the 10th of January, 1888.

In dealing with the consideration of my subject, two methods of treatment suggested themselves—viz., either to detail the various portions of the case and discuss it as a whole, or else to comment on each part separately, according as it is related. With the object of making myself as clear as possible, I have chosen the latter method. Whether I have been wise in my choice I leave to your judgment.

Post-mortem.—I now proceed to state briefly the main points observed in the *post-mortem* examination, without entering into

unnecessary detail, nor shall I mention the facts in the exact order in which they were observed.

The necropsy was made in the Courthouse of Coachford on July 21st, 1887—that is, seven weeks after death.

At this examination I had the assistance of Dr. Timothy Crowley, of Coachford. The coffin (an oaken one) was examined and found to be unbroken, and when opened the body was identified in my presence. It was clothed in a white garment, inside which was placed a flannel swathe encircling the abdomen; a white handkerchief passed beneath the lower jaw, and was tied over the vertex of the skull; the deceased had also on a pair of blue stockings.

The body was fairly nourished; the features were drawn; a brownish *post-mortem* slime was issuing from the nostrils and mouth. The face and hands were covered with a white mould. Extensive greenish discoloration was present on the abdomen, chest, back, and left side of neck. The dorsal aspect of the trunk and limbs exhibited evidences of the usual cadaveric ecchymoses. The cuticle had separated on the back and some parts of the limbs. No external marks of violence were discernible.

The internal examination showed the absence of any evidences of violence to the larnyx, trachea, &c. The lungs were healthy, and presented the usual evidences of *post-mortem* hypostasis at their posterior borders. The left pleural cavity contained two ounces of a *post-mortem* effusion of blood-stained serum, while the right held a smaller quantity. The heart and pericardium were found to be perfectly natural, the right cavities being moderately full of blood, the left being nearly empty. The thoracic viscera, with the exception of the larynx and trachea, were free from putrefactive changes.

The examination of the abdominal cavity showed the peritoneum to be quite healthy. The omentum was healthy, and contained a moderate amount of fat. The intestines were moderately distended with gas. All the organs were in an excellent state of preservation, the stomach and intestines presenting as fresh an appearance as if deceased had died but twenty-four hours previously. The only evidences of putrefaction present in the abdomen were found on the liver, which displayed early putrefactive colour changes, and

had a considerable portion of its surface studded with small white spots, due to the *post-mortem* deposition of phosphate of calcium; the gall-bladder contained a small amount of bile; the spleen and kidneys were healthy; the bladder was empty; the uterus and ovaries presented a healthy appearance.

I shall now describe the appearances found on examining the interior of the alimentary canal. There was nothing peculiar in the mouth or pharynx. The lower end of the œsophagus contained a number of white particles, the largest being the size of a small pin's head; towards its termination in the stomach the mucous membrane presented a number of oval abrasions about $\frac{1}{20}$ to $\frac{1}{12}$ of an inch in length; the membrane was also congested throughout. The stomach contained a small amount of slimy mucus; also a number of hard white particles, some of which were free, while others were partially embedded in the mucous membrane; the mucous membrane itself seemed perfectly healthy. The small intestines were coated on their interior in many places with patches of slimy mucus, of a bright yellow colour; a few white particles, similar in appearance to those found in the stomach, were present at the upper end of the duodenum. The coats of the greater portion of the duodenum, and adjacent few inches of the jejunum, showed extensive congested patches of a bright red colour. The mucous membrane of these portions of the gut was swollen and injected; the remaining portion of the small intestine was perfectly healthy. The large intestines were healthy, and contained only a small quantity of slimy mucus; no fæces were present in any portion of the bowel.

Remarks on the Post-mortem Examination.—The conditions above described clearly indicated that deceased had not died of typhoid fever, as certified by her husband; the condition of the heart and blood-vessels also proved the absence of any organic disease of these parts that would account for death. The appearances related as being present in the alimentary canal clearly must have resulted from the action of an irritant, and it was evident from the condition of the intestines that free purging of a bilious character must have preceded death. From the condition of the œsophagus, and the empty state of the stomach, one might naturally also conclude that

vomiting, probably of a painful character, had existed during life; and the remarkable state of preservation of most of the abdominal viscera pointed almost certainly to *arsenic* as the agent, and subsequent analysis proved this to be the case.

As an example of the *post-mortem* appearances resulting from arsenic, the case presents a few remarkable features, first of which may be mentioned the presence of congestion and abrasions in the œsophagus; and second, the absence of any of the usual characteristic lesions of the stomach. With regard to the former, Taylor ("On Poisons") states that "in some instances the mouth, pharynx, and gullet have been found inflamed; but in general there are no appearances in this part of the alimentary canal to attract particular attention."

In Blyth ("Poisons: their Effects and Detection") we find the following paragraph:—"The inflammatory and other changes rarely affect the gullet. Brodie never observed inflammation of the œsophagus as an effect of arsenic; but when arsenic is swallowed in the solid state, as in the suicide of Soufflard, graphically described by Orfila, it may be affected. In Soufflard's case there was a vivid injection of the pharynx and gullet." That arsenious acid was swallowed in the solid form, in the case I am detailing, was proved by the analysis. On the other hand, the absence of any characteristic appearances in the stomach is by no means uncommon. Several cases are recorded where no special *post-mortem* appearances in any of the organs were discovered. In Woodman and Tidy's work on "Forensic Medicine and Toxicology" (p. 138) a statement occurs—"That the more gradual the poisoning the more manifest is the action of the poison on the intestines, and the less manifest its action on the stomach." With regard to the intestines, as a rule, the effects of arsenic manifest themselves only in the duodenum and the rectum, though in some instances the mucous membrane of the small intestine has been inflamed throughout. In the case under discussion the effects were apparent in the duodenum and a small part of the adjoining jejunum; the mucous membrane of the rectum was not, I regret to say, minutely examined, the absence of fæces merely having been ascertained.

I take the following quotation from Blyth (*op. cit.*, p. 518):—"When arsenious acid is swallowed in substance or solution, the most marked change is that in the mucous membrane of the stomach and intestines; and even when the poison has been absorbed by the skin, or taken in any other way, there may be a very pronounced inflammatory action. On the other hand, this is occasionally absent. Orfila relates a case in which a man died in thirteen hours after having taken twelve grains of arsenious acid—'The mucous membrane of the stomach presented in its whole extent no trace of inflammation, no redness, and no alteration of texture.' Many other similar cases are on record; and according to Harvey's Statistics, in 197 cases, 36 (about 18·2 per cent.) presented no lesion of the stomach."

It is worthy of note that the liver presented evidences of putrefactive changes, notwithstanding that it contained, as will be shown, a considerable quantity of arsenic. Taylor (*op. cit.*) states that "absorbed arsenic does not appear in all cases to prevent the decomposition of the soft organs in which it is deposited." The putrefactive changes found in this organ were, however, very slight, considering the length of time that had elapsed since death. I may here mention that a slight amount of fatty degeneration was found to exist in this organ on microscopical examination. This is a tolerably common result of slow arsenical poisoning.

So far as could be ascertained, the sub-endocardial ecchymoses so frequently found in cases of slow arsenical poisoning, were not present, though I think it quite possible that, notwithstanding the excellent state of preservation of the heart, they might have become effaced even if present at death.

As relating to the putrefactive changes present, I think it well to mention that the grave where deceased was interred was situated on slightly elevated ground, and dug to the usual depth; the soil consisted of ordinary clay of a somewhat porous nature; it was quite dry when seen by me—this, of course, corresponded with the time of year and the unusually hot and dry summer. No chemical examination of the clay was made for arsenic, as would have been done if the coffin had been broken.

No examination was made of the contents of the cranial cavity—a fact which I am disposed to think might readily excite some unfavourable criticism. It is only right to state that I alone am responsible for this omission, as Dr. Crowley, who assisted me at the *post mortem*, suggested that it should be done. The following were the reasons which led me to determine that it was unnecessary:—1. Had deceased manifested any symptoms indicative of cerebral affections during life, I think it certain that Mr. Cross (whether innocent or guilty) would have indicated the fact in the death certificate. 2. The appearances present in the alimentary canal did not correspond to any form of brain affection. 3. I was satisfied that I had discovered sufficient causes to account for death. 4. Even had an examination of the brain or its membranes revealed the existence of any organic disease, the undoubted evidences of irritant poisoning would still remain unaccounted for. Therefore, while I freely admit it would have been advisable to make such an examination at the time, both to render the *post mortem* more complete and to avoid the possibility of adverse criticism, I still hold that, under the existing circumstances, such examination was not a matter of necessity. It may here be mentioned that at a subsequent period, when the brain was removed (as will be described later on), no coarse pathological appearances were present; and it is certain that no minute lesions could have been discovered at the time the first exhumation took place, owing to the histological changes which must inevitably have occurred during the interval between death and the date of examination—viz., forty-nine days.

Analysis.—The stomach and attached portion of the small intestine, which, along with the lower end of the œsophagus, were contained in a sealed and stoppered glass vessel, were first examined. The stomach contained one drachm of mucus, but no food. Several white particles were found all over the mucous membrane; some of these were free, others attached, or partly embedded in the membrane; some of them were distinctly hard, others not so. The majority of the particles were smaller than an ordinary pin's head. A few of these were removed, dried over a water-bath,

and then heated in a subliming-cell; they yielded a small crystalline sublimate of arsenious acid. A few others were treated by the reduction test, and yielded a faint ring of metallic arsenic. Some more of these particles were dissolved in distilled water and hydrochloric acid, and were treated by Reinsch's process, and yielded a deposit of metallic arsenic, which, on being sublimed, gave crystals of arsenious acid. The interior of the stomach and duodenum were scraped with glass; these scrapings were dried with a gentle heat over a water-bath, and were further placed to dry in vacuo. Particles similar to those in the stomach were present in the lower end of the gullet; these, on analysis, were also found to contain arsenic. Portions of the coats of the stomach and duodenum were separately treated by Reinsch's method and found to contain arsenic; these viscera were then carefully dried and set aside for further analysis. The liver, spleen, and right kidney were contained in a large sealed glass vessel; the bloody fluid contained in this vessel, which had exuded from the contained organs, was tested by Reinsch's method, and was found to contain arsenic in considerable quantity. Portions of the liver, kidney and spleen were each separately tested by Reinsch's process and found to contain arsenic—the liver in largest amount, the kidney, in smaller quantity, while the spleen contained only a trace. The pieces of copper employed in Reinsch's process when testing the liver and kidney, were heated separately in subliming tubes, and yielded sublimates which, under the microscope, were found to consist of distinct crystals of arsenious acid. The tubes employed, along with those used in some of the above tests, were sealed, labelled, carefully preserved, and were subsequently produced in court. A portion of the liver was divided in small pieces and placed to dry in a water-bath.

The dried scrapings from the stomach, along with this organ and the duodenum, were divided into two portions—one part being employed for the quantitative estimation of arsenic, while the other portion was treated with acidulated alcohol, for the extraction of alkaloids. The first portion was placed in a flask of pure hydrochloric acid, and distilled with the heat of a sand-bath; when

all the acid had come over, the residue was again drenched with a further quantity of pure hydrochloric acid, and distilled until left in a dry condition—the dried residue being subsequently examined for fixed metallic poisons. The acid distillate was divided into two portions; one-fourth was introduced into a modified form of Marsh's apparatus (the purity of which, as well as that of the materials employed, had been previously ascertained) and proved to contain arsenic. The remaining three-fourths was rendered free from organic matter; a current of pure sulphuretted hydrogen was passed through it for some hours; the precipitate of sulphide of arsenic was subsequently collected, dried, and weighed, and an estimate formed of the amount of arsenious acid present in the entire organs—namely, the stomach and duodenum; this estimate amounted to 1·74 grains. The portion of the stomach and duodenum and their contents, which was treated by a modified form of Stas' process, yielded a final extract, which was distinctly and persistently bitter, and when subjected to spontaneous evaporation gave a small crystalline residue, which yielded the colour reaction of strychnin in the most distinct manner, and formed with chromate of potassium characteristic microscopic crystals of strychnin chromate.

Portion of the small intestines was examined by Reinsch's process and found to contain arsenic. One-fifth of the entire liver, which had been previously dried, was extracted with hydrochloric acid, and the arsenic was weighed, as in the case of the stomach, as a sulphide; the result of approximate estimation indicated that this organ contained 1·28 grains of arsenic; thus the total amount of arsenic estimated amounted to 3·02 grains. This being a poisonous quantity, it was not thought necessary to make any quantitative estimation of the arsenic contained in the remaining viscera, more especially as they were preserved with the object of obtaining from them, if possible, an additional quantity of strychnin.

It may be well here to mention that in my evidence at the magisterial inquiry, and also in the report which I furnished, I stated that the liver contained over three grains of arsenic, and I think it only fair to myself to afford an explanation of how this

mistake arose. At the period during which I was conducting the analysis I was also acting as one of the Sectional Secretaries to the British Medical Association, and was at the same time making private arrangements to leave town on my annual holiday. The quantitative analysis of the stomach and duodenum was completed on July 27th; that of the liver on the 28th; the search for alkaloids was ended on the 29th; the examination for other metallic poisons took place on Saturday, the 30th. On that night, in addition to a large amount of other writing, I wrote a full report on the *post-mortem* examination; and thus, owing to the pressure on my time, I was compelled to write my analytical report on the night of Sunday, the 31st, as it had to be handed in early on the following morning. Unfortunately, when I came to do it, I found that my notes on the quantitative portion of the analysis (which were on a separate sheet of paper from the rest) had been left in my private room at the College where the analysis had been made. I therefore had to trust partially to memory; and as the liver was the last of the organs which I had been engaged at, and as I was impressed with the idea that it contained a large amount of the poison, and, moreover, I had the quantity (*three grains*) firmly fixed in my mind, I wrote the words—"This organ, which was specially subjected to quantitative analysis, contained over three grains," instead of the words—"The organs, which had been specially subjected to quantitative analysis, together contained over three grains." The following morning (Monday, Aug. 1) I was so busily engaged up to the time the magisterial investigation took place—viz., 10 a.m., in seeing my patients, that I had not a moment to go to the College for the missing portion of my notes. This I certainly would have done, even at the greatest inconvenience, were it not that I placed (as it appears) too much reliance on my own memory. In giving my evidence before the magistrate, as I was examined from my report, I naturally repeated my mistake, and after signing my deposition I almost immediately left for Dublin, as the meeting of the British Medical Association was to commence the following day. After the Dublin meeting terminated I went on my holiday, of which I stood in

much need, and returned to Cork on August the 22nd. As, however, I entertained no doubt of the correctness of the evidence I had given, I never became aware of my blunder until I was looking up my notes a short time before the trial. The moment I discovered the mistake I immediately acquainted the Crown Solicitor with the fact, who served notice to a similar effect on the prisoner's solicitor.

At the trial (as was most natural) counsel for the defence sought to make the most out of this error, and quoted the following passage from Wormley on "Micro-Chemistry of Poisons," p. 299:—"Absorbed arsenic is deposited to a greater or less extent in all the soft tissues of the body, and any of these may be made the subject of analysis. The greatest relative quantity, however, is usually found in the liver. The absolute quantity thus found, even under the most favourable circumstances, rarely exceeds a grain in weight." From this he endeavoured to make the jury believe that anyone who could be so ignorant as to make a statement to the effect that a human liver contained three grains of arsenic was unworthy of any confidence, and that consequently they were to disregard the entire of my evidence. Now I think it will be readily conceded by medical men that this, as I shall endeavour to show, by no means implies the absence of an extensive knowledge of toxicology; for we may search throughout the works of Christison, Taylor, and Blyth, on Poisons, and the standard work on Medical Jurisprudence by Taylor, and that by Woodman and Tidy, and not find a single statement in any of them that would justify us in arriving at a conclusion on the subject. It is only by looking over the records of a large number of analyses that one would obtain any reasonable idea of the quantities of the various poisons that are usually present in the individual organs after poisoning has occurred; and these quantities will necessarily vary enormously in different cases according to the dose administered, and a number of other circumstances which it is unnecessary to mention. Of course in any given case an analyst would merely give a statement of his own results; and, whatever be the quantity of poison found by him, it would be his duty to state it irrespective

of the results obtained by others in any number of other cases. Therefore, I trust I have said sufficient to convince my hearers that a statement to the effect that a human liver contained three grains of arsenic, did not necessarily indicate that the person who made it was deficient in toxicological knowledge.

In the work of Wormley, just referred to, in speaking of the quantity of arsenic present in the liver, the following passage occurs:—"According to the observations of Dr. Geoghegan, this organ usually receives its greatest quantity in about fifteen hours after the poison has been taken, when it may contain as much as two grains." I regret that I have been unable to discover any record of the observations on which this statement is based; accepting it, however, as being correct, while I readily admit that there is no recorded instance of such a quantity as three grains having been found in the liver, still I feel bound to maintain that no one can deny the possibility of such an occurrence under exceptional circumstances.

The statement of Dr. Geoghegan goes to show that from the large quantity of arsenic present in the liver of Mrs. Cross, we may arrive at the opinion that the last dose of the poison in her case must have been administered or taken at a comparatively short period before death—probably within twenty-four hours.

The additional points in the analysis which seem to call for special observation are the following:—The presence of arsenious acid in the alimentary canal, in solid form, was a proof that some, if not the entire, of this poison had been taken, or administered, in an undissolved state. The white particles described as being present in the stomach and elsewhere, in addition to arsenic, contained organic matter and the usual *post-mortem* deposits of lime salts. The bright yellow colour of the contents of the small intestines is to be attributed both to the presence of bile and to the partial conversion of arsenious acid into the yellow sulphide of arsenic.

The purity of all the materials was carefully determined, both before and after the performance of the various experiments, and Reinsch's process was selected as a general preliminary test, because of the ease with which it may be applied, and when carried out

with due precautions and verified by the production of a crystalline sublimate, it is absolutely characteristic and beyond all possibility of error.

It may be said that the method of quantitative analysis employed was somewhat old-fashioned; no doubt this is the case, but all chemists are agreed that it gives results almost as satisfactory as any other, and is therefore still in favour with many. Had I the appliances all ready at the time of making the analysis, I would probably have selected Bloxam's method in preference, as being more cleanly and easier of application.

Owing to the fact that strychnin *in small quantity* had been detected in the stomach, it became a most important matter for evidence to discover, if possible, whether this substance had been taken or administered in *poisonous quantity;* therefore I preserved for subsequent examination those portions of the viscera that were not used up in the analysis I have already described; and on my return home I made application to the authorities to have the body of Mrs. Cross re-exhumed. The necessity for doing so is well set out in the following passage from Blyth "On Poisons" (p. 320):—"Should search be made for minute portions of strychnin in the tissues, considering the small amount of the poison which may produce death, it is absolutely necessary to operate on a very large quantity of material. It would be advisable to take the whole of the liver, the brain, spinal cord, spleen, stomach, duodenum, kidneys, all the blood that can be obtained, and a considerable quantity of muscular tissue, so as to make in all about one-eighth to one-tenth of the whole body. This may be cut up into small pieces, and boiled in capacious flasks with alcohol, acidified with acetic acid. . . . . It is only by working on this large scale that there is any probability of detecting absorbed strychnin in those cases where only one or two grains have destroyed life, and even then it is possible to miss the poison."

Accordingly, having obtained the desired permission, the body was again exhumed on the morning of August 23rd, when I removed the heart, lungs, remaining kidney, brain, and a large mass of muscle from the thigh. I may here remark, in passing,

that notwithstanding the previous exposure, the body presented very little additional evidence of putrefactive changes than those present at the time of the first exhumation, the flesh from the thigh being of a bright red colour, and as free from putrefaction as if death had only occurred twenty-four hours previously. All the parts now removed, together with those preserved from the former chemical examination, were carefully treated by a modified form of Stas' process for the separation of strychnin, with the result that slightly less than the one-hundredth of a grain was obtained in a crystalline form.

Since the occurrence of the Cross trial, the statement has been made, both in articles which appeared in journals, some of which were of a scientific nature, and in the letters of some correspondents, that strychnin is a substance which undergoes rapid destruction in dead bodies; such a statement is quite erroneous. I again quote from Dr. Blyth's work:—"At one time it was believed that strychnin might be destroyed by putrefaction, but the question of the decomposition of the poison in putrid bodies may be said to be settled. So far as all evidence goes, strychnin is an extremely stable substance, and no amount of putrescence will destroy it. M'Adam found it in a horse a month after death, and in a duck eight weeks after; Nunneley in fifteen animals forty-three days after death, when the bodies were much decomposed; Roger in a body after five weeks' interment; and, lastly, Richter in putrid tissues exposed for eleven years to decomposition in open vessels."

A number of my critics, and several of my best friends, have remarked that it was strange, in a criminal case of such grave importance, that I did not seek the assistance of a second analyst, more especially as this was the first case of arsenical poisoning in the human subject which I had an opportunity of investigating. Now, I am quite willing to admit that, as a rule, it would be advisable in all cases where the life of a human being is at stake to have two skilled experts employed, but this, I submit, is a matter for the State to determine.

There is no doubt that the presence of a second expert would greatly lighten the burden of responsibility and divide the distri-

bution of counsel's abuse, though the latter is a matter of insignifi cance. But in this instance (owing to its being the first), had I asked for assistance, in all probability the Crown would have handed the work over to some one who would be willing to undertake the entire responsibility; and in any case unfriendly critics would say that I must have felt myself incompetent for the duty, and would therefore give all the credit of the work to my *confrère.* It may be well further to point out that I have been engaged more or less for the past twelve years in chemical studies and pursuits, a considerable portion of which were of a physiological nature; that I acted as assistant to my predecessor, the late Dr. O'Keeffe, in preparing experiments for his class, and in numerous organic analyses; that since my appointment as Lecturer on Medical Jurisprudence in the Queen's College, I have repeatedly extracted poisons of different kinds from the bodies of various animals and organic mixtures; that I have made it a regular custom to perform for my class the experiment of extracting arsenic from portions of bodies taken from the dissecting-room, into which this substance has been injected for the purposes of preservation; that there is absolutely no difference whatsoever to be observed in the process of extracting poisons from human viscera and that employed when dealing with other organic matter; and finally, that arsenic is one of the most easily separated and readily demonstrable of all poisons. Therefore, the observation of counsel that somebody who had previously extracted arsenic from the body of a person who died from the effects of this poison should have been employed, goes for absolutely nothing; and I think it is not to be much wondered at that I felt under no need of any assistance. On calmly reviewing the whole matter, with the knowledge now at my disposal, while it is possible (now that I trust my competency might not be so much questioned) that if a future case arose I might apply for some aid, still, if the whole circumstances were to occur over again, I should undoubtedly act in precisely the same manner as I have done.

Symptoms during Life.—Very distinct evidence was produced to show that the late Mrs. Cross presented well-marked symptoms of arsenical poisoning during life. Thus, it was sworn by Dr.

Godfrey that he saw her eight or ten days before death, that she seemed to be suffering from a bilious attack, and had a damp handkerchief round her forehead; he was satisfied she was not suffering from typhoid fever. She was seen by Mrs. Caulfield on May 25th, and was then suffering from vomiting, thirst, and diarrhœa; but the chief evidence was that of a Miss Jefferson—a friend of the deceased—who was staying on a visit in the house, and who was enabled to give a very accurate account of the symptoms from notes she had made in her diary. This lady swore that Mrs. Cross was ill and confined to bed on the 10th and 11th of May; she seemed to have an attack and spasm of the heart, with cramps, sick vomiting, and diarrhœa. She was suffering in a similar way on the 13th and 14th, and again on the 16th and 17th. She was better on the 18th, and went for a walk, drove to church on the 19th, and took dinner with the family on that day. She was ill again on the 20th and 21st, had pain in the upper part of her stomach, or heart, with vomiting and diarrhœa, and was drowsy. On the 22nd she was better, and went into the garden. This was the last time she was out. She was very ill in bed on the 24th, with vomiting and diarrhœa. She had the same symptoms, but in a worse form, on the 26th, which alarmed the witness. On the 27th she complained of great pain in the forehead, and the eyes became affected; they seemed irritated and inflamed, and she complained that she could not see things at a distance distinctly, and could not see to read or write. On the 29th she was very ill with the same symptoms as before, but much weaker. The same symptoms were present, to a greater or lesser extent, on the 30th and 31st, and the 1st of June; but she was gradually getting weaker, and was frequently drowsy; and it appears that she died either on the night of the 1st or on the morning of the 2nd of June. Her head seemed clear, and she was quite intelligent, being able to describe her state and to express her wishes. Miss Jefferson, at an early period of Mrs. Cross's illness, saw her getting a dose of what was said to be gentian; this appeared to make her sick. She also saw Mr. Cross give her chlorodyne, which seemed to make her very drowsy and stupid. Evidence of a similar nature regarding her symptoms was

given by the servants of the house; one of whom (Mary Buckley) swore on one occasion she saw Mr. Cross taking up some chicken broth; she saw Miss Cross on various occasions taking up sago, bread and milk, &c. She had often heard Mrs. Cross complain of her heart previously to her late illness, and had seen her stop and put her hand to her heart when going up stairs, as if she was panting. On the night of Mrs. Cross's death, when sleeping in a room with two other servants, she awoke suddenly and heard Mrs. Cross screaming, as if in pain; this lasted four or five minutes.

Mary Magrath (housemaid) attended on Mrs. Cross during her late illness; she saw her get on different occasions, in addition to drinks, sago, corn-flour, and chicken broth. On one occasion she saw Mr. Cross, a few days before death occurred, give her a dose of chlorodyne; this was taken from a bottle on the mantel-piece, and Mr. Cross poured it into a minim glass, which he did not fill. This dose made her vomit just after taking it. She (Mrs. Cross) said it made her sick, and she wished she had not taken it. The witness also swore that deceased was, owing to the condition of her eyes, unable to read her letters on one day; that she suffered from vomiting, diarrhœa, and pains in the region of her heart; that she was almost continuously vomiting for the two or three days immediately preceding death; that the vomited matter was yellow or greenish-yellow. This witness, in addition, stated that she saw Mrs. Cross (previously to her late illness) get fits on three occasions; she got stiff, clashed her teeth together, used to fall down and complain of her heart. These attacks lasted about ten minutes, when her mistress was again able to get about. Evidence was also given that Mrs. Cross was supplied with various drinks—*e.g.*, toast-water, lemonade, &c. Any additional points in the evidence which are necessary for my purpose I shall refer to later on.

Now, from the evidence above detailed, more especially that of Miss Jefferson, it seems clear to me that we may deduce the following:—1. That the late Mrs. Cross presented during life very well-marked and unmistakable symptoms of slow arsenical poisoning. 2. That from the distinct intervals of remission which

occurred, followed by a return of the symptoms with increased severity, it appears that the illness was due to several successive and increasing doses of the poison. 3. That it is impossible to conceive that any medical man could be under the impression that this was a case of typhoid fever.

A large number of bottles and packets were removed from the surgery of Mr. Cross immediately after his arrest; several of these were specially selected and submitted to me for chemical examination. Amongst them were three packets, marked "Dog Poison," which contained strychnin in a crystalline and almost absolutely pure state; the largest of these held over 86 grains. There were five bottles containing tartar emetic in variable quantities, and there was a 1-oz. bottle marked "Fowler's Solution of Arsenic—dose, 3 to 5 drops;" this bottle contained three drachms and twenty minims of Fowler's Solution. I may here mention that it was ascertained from the chemist who supplied this bottle to Mr. Cross that it had been got a considerable time before his wife's death; that the bottle was only half filled in order that it might be the more convenient for dropping. Thus it would appear that only forty minims had been taken from the bottle—*i.e.*, a quantity equivalent to one-third of a grain of arsenious acid. These facts might have been produced in evidence if it was thought advisable to do so. Amongst the remaining articles examined was a bottle of Brown's Chlorodyne, about two-thirds full, and a broken minim measure, which was taken from the mantel-piece in Mrs. Cross's bed-room, and which contained a trace of chlorodyne. It is unnecessary to refer to the contents of the various other bottles.

Evidence was given by Mr. Kiloh (chemist) that Mr. Cross purchased on September 2nd, 1886, 1 lb. of white arsenic, for the purpose of sheep-dipping. The witness was unable to say whether on this occasion, owing to the purchaser being a surgeon, the arsenic had or had not been mixed with soot or indigo.

Sergeant Higgins deposed that he was in charge of the prisoner on the first day of the magisterial inquiry, which took place on August 1st, and that in a conversation which took place between the prisoner and his sister he overheard the following, of which he

made a note at the time:—Mr. Cross asked his sister, "Did you see the two little bottles about the length of my finger?" She answered, "Yes, yes; I destroyed them with the other things." He added, "With the white powder in them?" And she again said, "Yes, yes; I destroyed them with the other things."

The Case for the Crown.—This, it may be briefly stated, was that Mr. Cross had acquired a passion for his governess, and had actually, on more than one occasion, occupied the same bed-room with her in a hotel in Dublin; that, in consequence, he had become more than indifferent to his wife; that he resolved to get rid of her, and did so by slowly poisoning her with arsenic; and at the end, owing to impatience, he hastened her death either by the administration of strychnin or by violent means. It was also shown that he prepared her friends beforehand for the probability of hearing of her sudden death; that he gave a false account of her symptoms, a false certificate of death, with variable accounts to her relatives and others as to the precise cause—at one time saying it was stoppage of the heart, and at another angina pectoris, having previously certified and stated it was typhoid fever. He hurried on the funeral, had communication with Miss Skinner about the time of his wife's death, got married to this lady shortly after, and would have kept the marriage secret but for the letter received by a neighbour.

Now it appears to me that there were various important points in the case which counsel for the Crown failed to bring forward; some of these I shall now briefly mention:—1. No attempt was made to show that all the facts, as detailed in evidence, were consistent with the administration of strychnin at the close of the tragedy; that such might have been done I shall presently endeavour to prove. 2. No comment was made, which to me seems most remarkable, on the absence of arsenic (with the exception of the small quantity of Fowler's Solution previously referred to) from the collection of articles taken from Mr. Cross's surgery. 3. Although I stated in my examination that the administration of a narcotic would have the effect of diminishing or preventing the painful symptoms which arsenic might cause, and there was dis-

tinct proof of the frequent recurrence of drowsiness and of the administration of chlorodyne, counsel failed to catch the idea that the latter was evidently administered with this express object. Some additional points will be referred to when dealing with the subject of the defence.

The Defence.—This was of a singularly weak nature, and might be said to consist altogether of two very eloquent speeches by counsel, which contained a good deal of matter foreign to the evidence, a large number of misrepresentations, many of them, no doubt, unintentional, and, as might naturally be expected, in the absence of anything of a really tangible nature, a good deal of abuse of some of the Crown witnesses—myself, of course, included. The only witness produced was Miss Cross, sister of the accused who swore that she always considered the late Mrs. Cross a delicate woman, with a delicate stomach, subject to attacks of the heart; that she, the witness, frequently attended on Mrs. Cross during her late illness, and often brought her drinks and other nourishment; that on the night of Mrs. Cross's death she went to bed about half-past ten; that during the night she was roused by a little scream from Mrs. Cross's room; this was followed by two or three little screams, after which she heard her brother go down stairs; during his absence she heard another scream or cry; she heard him come up again and re-enter the room; almost immediately after he came to her own room; she rose at once and went to the other room; she went to the side of the bed, and saw Mrs. Cross lying quite still, her head on one side, and her hand as if it had been on her heart; she thought her dead, but brought the hot water tin from her own bed and put it to her hands, with the hope it would restore her, but without effect; after that she went and lay on her bed, and rose in the morning about seven; the dead body of Mrs. Cross was not rigid; death took place on Thursday; and on the Monday or Tuesday following witness was in Mrs. Cross's bedroom with her brother; close to Mrs. Cross's bed was a private press or wardrobe, the keys of which were always kept by deceased; she examined the contents of this press that day, and found in it, in addition to clothes or other articles, three or four

bottles, one of which contained rouge, and another some white powder; this she showed to her brother, and then threw its contents amongst some other rubbish in the grate; she put the bottle on the chimney-piece, and, subsequently, sent it downstairs to be washed; several bottles were taken down to be washed after Mr. Cross came home. In cross-examination the witness admitted that the conduct of her brother towards his late wife was often hasty, and he used sometimes curse her. During the two and a half years witness was in the house she could remember only one day on which, previously to her fatal illness, the deceased was confined to bed—this was for a gastric attack—the date of which was uncertain; she did not think her sister-in-law was in danger; her brother never told her so, but she often heard him say she might pass away from her heart; he had told her that the deceased had a low fever, of the typhoid type; she saw her brother on various occasions give Mrs. Cross, during her illness, chlorodyne, sal volatile, or ether; she saw applications of mustard poultices being made on different occasions to the pit of the stomach, to relieve the pain from which her sister-in-law suffered when she vomited. The witness did not know where her brother was when she left the dead woman's room and went to bed; she attached no importance to the destruction of the white powder which the bottle contained; it was not labelled; her brother said to destroy it; she never said there were two bottles with white powder. She further stated that at the conversation referred to by Sergeant Higgins, Mr. Cross said, "Do you remember the two little bottles with some white powder that were amongst that rubbish?" She said, "I do." And he then said, "Is it possible that could have been arsenic?" She believed she said that she destroyed them. On the night Mr. Cross came into her room he had not taken off his clothes at all.

The line of defence adopted by prisoner's counsel in his opening speech was, first of all, to show the improbability of the prisoner's committing the crime in the manner attributed to him, and he denied the existence of a sufficient motive for the crime, as it was shown that the prisoner was able to gratify his passions during the lifetime of his late wife. He asked the jury to disregard the evidence

of the analyst, upon which the whole case rested, on the grounds that he had never performed a *post-mortem* examination previously on a person killed from arsenic, and had never before analysed human viscera for arsenic. He also endeavoured to show that strychnine could not have been employed, as the evidence went to prove that the body of Mrs. Cross was not in a bent and rigid condition at the time of death or some five or six hours after.

One of the prisoner's counsel, in his reply to the jury, endeavoured to make them believe that the quantity of strychnine said to have been discovered ($\frac{1}{100}$ part of a grain) was so minute that it was beyond human comprehension that anyone could discover it, because it was only the $\frac{1}{43750}$ part of an ounce. This gentleman also likened the liver to a sponge, which was only capable of sucking up a certain amount of any substance, and, therefore, it could not possibly contain such an amount as three grains of arsenic; and, strange to say, the learned judge in his charge seized upon this as being an excellent illustration. This goes to show the utter absurdity of anyone trying to deal with scientific matters on which they are wholly ignorant. Scarcely anything could be more far-fetched than the idea here conveyed; and even if the liver did act in the manner ascribed to it, it is a strange sponge which, while itself weighing 21,875 grains, could absorb only 3 grains, *i.e.*, $\frac{1}{7292}$ part of its own weight.

It is worthy of remark that no medical expert was produced for the defence, although the services of Dr. Rawdon Macnamara were retained, and he was actually present in court during the entire trial. I think it will be generally admitted that, in the fact of their not doing so, prisoner's counsel displayed a wise discretion. Undoubtedly his production would have had the effect of strengthening the case for the Crown, as in cross-examination he would have been bound to admit several points of great importance, some of which were not elicited from myself when under examination. Amongst these I may mention the following:—1st. That the symptoms described were those of arsenical poisoning. 2nd. That the *post-mortem* appearances were corroborative of the same. 3rd. That the tests and methods employed by me were quite correct.

4th. That the tubes produced in court (if submitted to his examination) contained crystals of arsenious acid. 5th. That it mattered not, so far as the duties of an analyst were concerned, whether he had ever even seen the interior of a human body; and that no distinction was observed in separating poisons from the organs of the lower animals and those of the human subject. 6th. That the quantity of strychnine discovered was more than sufficient to prove its nature, and that by the careful employment of the colour-test the presence of even $\frac{1}{100000}$ part of a grain could be satisfactorily demonstrated. 7th. That the crystals of arsenic are so highly characteristic as to be capable of recognition under the microscope when only $\frac{1}{10000}$ part of an inch in diameter, and may be obtained when only $\frac{1}{50000}$ part of a grain is employed in the test. 8th. That it mattered not in the least, so far as the prisoner was concerned, how the poison discovered was distributed throughout the various organs; and that to a medical man the fact of even a single grain being present in the entire body would be quite sufficient to prove that a poisonous dose had been administered or taken.

I have already stated that it might have been shown by the Crown that the conditions present immediately after death were not inconsistent with the termination of life by strychnine poisoning. I shall now proceed to prove that such was the case:—It is well known that when death takes place from strychnine, as a rule, the body becomes quickly rigid, the rigidity usually persisting for a considerable time; when the person dies during a convulsion, and rigidity immediately supervenes, the distorted condition of the body and limbs may persist after death; this, however, is the exception, and not the invariable rule, as counsel ingeniously represented. In Taylor's "Medical Jurisprudence," Third Edition, edited by Dr. Stephenson (Vol. I., p. 432), the following quotation occurs:—"The body of a person poisoned by strychnine may, therefore, be found in a non-rigid state within the ordinary period after death." And again:—"In other instances of strychnine poisoning, no particular degree of rigidity has been found at any period after death." It is also a well-known medical fact that in the bodies of

those who died in an exhausted condition, either from disease or otherwise, rigor mortis supervenes very rapidly, and is of transient duration. Now I think it will be readily conceded that the late Mrs. Cross, at the time of her death, owing to repeated vomiting and diarrhœa, must have had her nervo-muscular system reduced to a degree of very great exhaustion. We may, therefore, conclude that, whether a dose of strychnine had or had not been employed to terminate her existence, in either case *post-mortem* rigidity would have quickly set in, and disappeared in an evanescent manner; so that it is almost certain no trace of rigidity would have remained after the period which had elapsed between the occurrence of her death and the time at which she was first seen either by Miss Jefferson or the servants on the following morning.

When under examination I was asked if I could account for the screams which were heard by Miss Cross and the servants; this I declined to do, as more than one possible cause suggested itself to my mind. The popular opinion which I have heard expressed is that they were due to the employment of violence. With this I do not agree; as I believe that if violence had been employed, precautions would have been taken to prevent their occurrence. No explanation would account for them more satisfactorily than the supposition that they were produced by the painful convulsions due to strychnine poisoning. I must, however, here point out that convulsions of a painful character are very frequently present towards the close of cases of slow arsenical poisoning. If, however, we adopt this latter suggestion, we must account for the presence of strychnine in the body of the deceased. This, I think, may be readily done, as it is perfectly evident that from the loose manner in which packets of this substance were left knocking about Mr. Cross's surgery, it is not difficult to conceive that a small quantity might have become accidentally mixed with a packet of arsenic. I do not, however, believe that this was the way in which it came to be present.

When subjecting me to cross-examination, prisoner's counsel very properly sought to show that I might have been led into confounding a ptomaïn with the alkaloid strychnine. This possible

source of error, I may say, received my most careful consideration at the time of my analysis, and led me to adopt the utmost precautions, so as to avoid the possibility of such a mistake. Counsel quoted the following passage from Blyth (*op. cit.*, p. 466) in support of his case:—"Nevertheless the existence of ptomaïnes may be conceded, and also the fact that some of their reactions and properties resemble such alkaloids as strychnine, morphine, &c., but such differences for the most part exist that a careful and experienced toxicologist would not be likely to form erroneous conclusions," and of course he would not admit that the present writer could be regarded as such. Referring to the colour-test for strychnine, Dr. Blyth (*op. cit.*, p. 322) says:—"These characters—viz., alkalinity, bitterness, and the property of precipitation by potassic chromate in a definite crystalline form, the crystals giving the colours detailed—belong to no other substance known save strychnine, and for all purposes sufficiently identify the alkaloid." The existence of all the characters here set forth, as already mentioned, was carefully ascertained in the present instance.

It may be interesting to my hearers to know that the presence of a ptomaïn was actually discovered, which had a pungent odour and taste somewhat resembling veratrine, and which, on the addition of sulphuric acid, displayed a crimson colour. It is almost needless to remark that this could not have been confounded with strychnine, which gives no coloration with sulphuric acid alone. I made no reference to the discovery of this substance in my evidence, as I thought it might only lead to confusion and serve no useful purpose.

I shall now briefly consider from a medical point of view the possible lines of defence which might have been adopted in this case, and how they might have been successfully met:—1. That Mrs. Cross did not die of poisoning at all, but succumbed to some heart affection or other natural cause. 2. That she did die of arsenical poisoning, and that this might have occurred through self-administration, either by accident or design. 3. That she might have been poisoned, accidentally or otherwise, by others beside the prisoner.

Now, it is difficult to conceive how any sensible person, in the face of the evidence which I have detailed—namely, the presence of well-marked symptoms of arsenical poisoning during life, the distinct *post-mortem* appearances corresponding thereto, and finally the presence of arsenic in poisonous quantity in the body—could adopt the first of these defences; yet this has been the theory adopted by some of those who sought to prove the innocence of Mr. Cross since his conviction. The possibility of accidental poisoning is clearly disproved by the history of the symptoms detailed by Miss Jefferson. It may, no doubt, be said that a single poisonous dose of arsenic has been known to give rise to a prolonged and fatal illness, with distinct intervals of remission in the symptoms. If this view had been put forward it might be readily met by the assertion that, if only one dose had been swallowed at the commencement of the illness, not a trace of the poison would have been present in the system at the time of death.

If it was suggested that others beside the prisoner administered the poison with criminal intent, in the absence of motive, it would have to be admitted that such must have occurred only at his instigation, in which case he would have been equally guilty.

It seems to me that the only line of defence which might have met with a reasonable prospect of success would have been to boldly admit the fact that the poisoning actually took place through self-administration, and that the prisoner was really under the impression that his wife was suffering from typhoid fever or some other gastro-intestinal affection, and that the chlorodyne was administered with the best intentions to allay the symptoms; and even it could have been shown that small doses of strychnine might naturally be employed for a similar purpose.

In Quain's "Dictionary of Medicine" (Vol. II., p. 1685), a bilious form of typhoid fever is described as follows, which closely resembles arsenical poisoning:—"The characteristic feature is frequent, sometimes almost incessant, vomiting of liquid containing bile, both after food and when no food has been taken; severe headache often persists throughout the attack; the temperature does not, as a rule, rise high, and it fluctuates much; the face is pale and anxious; the pulse is frequent and very weak; the tongue

is usually coated, and may be white or yellow." It might (if thought advisable) have been shown that arsenic is sometimes administered in typhoid fever to restrain diarrhœa, and is also frequently given to prevent the paroxysms of angina pectoris; and that strychnine is also sometimes given for the latter affection as well as to check vomiting (see Lauder Brunton—"Pharmacology and Therapeutics"—Index of Diseases and Remedies). I need scarcely point out that no such case as I have here made out was produced for the defence; had such been done, I do not think it likely that it would have proved successful. I shall endeavour to point out how the various points might have been met by the prosecution. With reference to the variety of typhoid alluded to, it must be acknowledged that it is of such rare occurrence that few medical men have met with a case of the kind; and that if present it would be more likely to be mistaken for a case of irritant poisoning than for the opposite to occur. Now, as regards the self-administration, I have already pointed out that owing to the fact that repeated doses must have been administered in order to produce the symptoms present in this case, the possibility of accidental administration on such a number of occasions cannot be admitted. If it was put forward that Mrs. Cross deliberately took poisonous doses of arsenic on repeated occasions, with the object of committing suicide, we should have to believe that she subjected herself to a slow and painful form of lingering torture such as cannot be found recorded in toxicological literature. On the other hand, it has been suggested that this lady was in the habit of taking arsenic as a cosmetic, or that she was an arsenic-eater, such as may be found amongst the inhabitants of Styria. If she employed it at all for the former purpose it is nearly certain it would have been in the form of solution and not in the solid state; this would also have been the form of administration most likely to have been chosen if administered for medicinal purposes. If the latter theory be chosen, it will have to be admitted that arsenic-eating, after the manner of the Styrians, is quite unknown in this country; yet, even if such a practice had been acquired, can anyone believe that a person eating arsenic to benefit the health would continue to employ it in poisonous doses when it produced such violent

symptoms? We are, therefore, forced to the conclusion that the poison must have been administered by some other hand. Now, much fault has been found with the judge who tried this case for directing the jury that if they were satisfied that the deceased died from poisoning they were bound to find the prisoner guilty. While I think he might readily have allowed the jury a little more latitude for the exercise of their own judgment, I utterly fail to see how either he or they, with the evidence before them, could arrive at any other conclusion. It will be observed that, so far as my evidence is concerned, it merely went to prove the cause of death, and in no way implicated the prisoner. A critical examination of the speech delivered by the prisoner, previously to the passing of sentence, shows it to be wholly inconsistent. If some of the statements made by him were true they could have been proved in evidence. It is interesting to note that his account of the destruction of the bottles does not correspond with that of his sister, nor hers with that of the police sergeant who overheard the conversation and wrote it down; and, strangest of all, he admits, what Miss Cross did not, that there was a patent medicine in the wardrobe which contained strychnine.

It has been remarked that the prisoner, considering that he was a medical man, committed this crime in a very clumsy manner. I do not altogether agree with this. He selected a poison which was without *odour*, *taste*, or *colour*—therefore most easy of administration; he exhibited it in repeated doses, so as to produce a prolonged illness, and gave chlorodyne to mask the painful symptoms; he prepared her relatives and friends for her approaching death, gave a false account of her symptoms, and, once she was buried, who would have heard of the "Cross Poisoning Case" if the hasty marriage had not occurred, or had remained a secret for six months? On calmly reviewing the entire features of the case in the most unprejudiced and dispassionate manner, which I have done on repeated occasions, I cannot for one moment conceive how any sane person can bring himself to believe, even if he say so to others, that Philip Henry Eustace Cross was innocent of the crime of which he was found guilty and for which he was deservedly executed.

THE DISTRIBUTION OF ENTERIC FEVER IN THE CITY OF DUBLIN.

By T. W. GRIMSHAW, M.D.,
Registrar-General for Ireland;
AND
SIR CHARLES A. CAMERON, M.D.,
Superintendent Medical Officer of Health for the City of Dublin.

[Read in the Section of State Medicine, April 6th, 1888.]

The prevalence of enteric fever in Dublin has recently attracted much public attention on account of the prevalence of that disease among the troops of the Dublin Garrison. We have each in our own sphere had the peculiar features of enteric fever, as they present themselves in Dublin, brought under our notice from time to time.

In a paper read by one of us before the Medical Society of the College of Physicians in the year 1871, it was pointed out that enteric fever showed a tendency to increase, and stated:—"When it is remembered that enteric fever is now generally considered by sanitarians to be dependent on defective drainage or impure water supply, it is difficult to account for this sudden increase of that form of fever in Dublin, as we know that the water supply is nearly perfect, and that the drainage has been steadily though slowly improving. This increase of enteric fever is difficult to explain. It has been suggested to me that the stirring up of dirt, consequent on the construction of new drains, might be the cause; but I cannot see that this can account for it, as I find fever connected with local unsanitary conditions, and I have not, in any of the fever-nests I have visited, discovered that there has been any such local stirring up, for the very good reason that there has been no attempt at forming effectual drains for those houses. I do not believe that the Vartry water is the cause, as, if it were, the increase of enteric fever should have occurred before the present

year."[a] Thus the fact that enteric fever was increasing in Dublin was long since noticed; whilst, on the other hand, the decrease of typhus and the almost total absence of relapsing fever are well known.

The following figures show the rate of mortality per 1,000 persons living caused by typhus fever, enteric fever, and the principal zymotic diseases (including typhus and enteric fevers) in Dublin during six years:—

	1881	1882	1883	1884	1885	1886	1887
Typhus fever, .	0·70	0·30	0·52	0·30	0·18	0·11	0·07
Enteric fever, .	0·35	0·40	0·37	0·42	0·42	0·38	0·38
Principal zymotic diseases,	2·80	3·81	3·52	3·51	3·47	2·88	5·12

These figures show that whilst a considerable falling off in the mortality caused by typhus fever has occurred since 1881, the fatality due to enteric fever has been much the same in every year of that period. A large sum of money has been expended since 1881 in the construction of main sewers and house drains; but there does not seem to be any effect produced thereby in the way of diminishing the amount of enteric fever.

It is almost impossible to say when enteric fever had made a home for itself in Dublin; but that this malady has shown an undue partiality for Dublin during the past ten years is undoubtedly an unpleasant fact. Our attention has been specially called to this subject in connection with an inquiry recently held by us, at the request of the War Office, into the cause of the prevalence of enteric fever in the Royal Barracks.

In carrying out this investigation we found it necessary to compare the enteric fever death-rate of Dublin with that of the country generally, and with some places in particular. The result is somewhat remarkable, as shown in the following statement:—

[a] Prevalence and Distribution of Fever in Dublin. By T. W. Grimshaw, M.D. Dublin: Fannin & Co. 1878.

Deaths from Enteric Fever in (a) *England and Wales*, (b) *Ireland*, (c) *London*, (d) *Dublin Registration District, with the rate per* 1,000 *living—Years* 1876–85.

Locality and Year		Deaths from Enteric Fever	
		Number	Rate per 1,000 living
England and Wales	1876	7,550	·31
	1877	6,879	·28
	1878	7,652	·31
	1879	5,860	·23
	1880	6,710	·26
	1881	5,529	·21
	1882	6,036	·23
	1883	6,078	·23
	1884	6,380	·23
	1885	4,765	·17
	Average	**6,344**	**·25**
Ireland	1876	961	·18
	1877	974	·18
	1878	965	·18
	1879	1,037	·20
	1880	1,087	·21
	1881	813	·16
	1882	844	·17
	1883	853	·17
	1884	693	·14
	1885	716	·15
	Average	**894**	**·17**
London	1876	769	·22
	1877	901	·25
	1878	1,033	·28
	1879	849	·23
	1880	702	·19
	1881	971	·25
	1882	975	·25
	1883	963	·24
	1884	925	·23
	1885	597	·15
	Average	**869**	**·23**
Dublin Registration District	1876	151	·48
	1877	153	·49
	1878	189	·61
	1879	201	·64
	1880	188	·60
	1881	123*	·35
	1882	135	·39
	1883	132	·38
	1884	134	·38
	1885	144	·41
	Average	**155***	**·47**

* District enlarged in 1881.

If we bring the Dublin figures up to date we find that the deaths in the Dublin Registration District were 129 in 1886, and 135 in 1887, showing but little variation from the five preceding years.

This table has been compiled for ten years, five before and five after the last census period, thus giving a period in which population standards are least likely to be disturbed. The table was specially compiled for these years with a view of covering a certain period of prevalence of the disease in the Royal Barracks. The result shows that the average death-rate per 10,000 of the population in England and Wales in the decade 1876–85 was 0·25; in Ireland 0·17, or 0·08 less. In London the average rate was ·23, being only 0·02 less than England and Wales, while in Dublin it was 0·47, or nearly three times the average rate of Ireland, and more than double the rate of London for the same period. It will, however, be noted with satisfaction that each division of the table shows a general tendency to decreased mortality, and Dublin has shared in this favourable tendency.

Now, why should Dublin, which formerly does not seem to have been a favourite station—to use a botanical phrase—for enteric fever, have become one? We believe the answer is that Dublin formerly had not been sufficiently invaded by the disease, but that when the disease had obtained a footing, it found favourable soil-conditions for its development in the general unsanitary state of the city, and more especially in the peculiar geological formation of the district. We shall deal with the latter first. Pettenkofer, referring to the relation between the presence of "ground water" and the production of enteric fever, says:—"Just as in certain places the existence of typhoid fever exhibits a certain temporal dependence on the variations in the moisture of the soil of the so-called 'ground water,' in like manner it is probable that cholera is similarly dependent, though, owing to the fortunately less frequent prevalence of cholera, the relationship cannot be so regularly and satisfactorily proved as in the case of typhoid fever."

Dr. Mapother, in his lectures on Public Health, showed a close relation between the prevalence of cholera and old river courses in the city of Dublin. Again, in a paper read before the Medical

Society in 1878, the close relationship between the distribution of cholera in Dublin and the extent of the pervious stratum of gravel situated in the low-lying parts of the city and suburbs of Dublin was shown.[a]

Pettenkofer has shown that the geological condition favourable to the spread of cholera is also favourable to the prevalence of enteric fever. As pointed out in the paper above referred to, cholera in 1866 prevailed to a much greater extent on the pervious gravel bed than on the stiff clay, these formations constituting the ground on which Dublin and its suburbs are situated.

A considerable portion of the district is situated on gravel which is superimposed on the stratum of clay previously mentioned. This gravel bed was once the bottom of the sea, and now consists of a raised sea beach which extends along a considerable portion of the east coast of Ireland. This "littoral" gravel bed, commencing at the extreme north of the Dublin district at Dollymount, forms a narrow strip running along the Clontarf Strand; it then passes more inland along the estuary of the Tolka up to Drumcondra, including the suburbs of Richmond, Fairview, and Ballybough. On entering the city its boundary line passes slightly south of Summer-hill and Great Britain-street—in some cases crossing the latter street, crossing the upper end of Capel-street—and gradually sloping southwards to the lower end of Smithfield passes just in front of the Royal Barracks along Parkgate-street, inside the Park wall along the Conyngham-road; the boundary crosses the Liffey at Island-bridge, turns towards the south-east, past the north-east corner of Steevens' Hospital, along the face of the slope between James's-street and the Liffey, reaching to St. Audoen's Church at the back of Christ Church, crosses the top of Parliament-street, passes along the back of the houses on the north side of Dame-street, crosses College-green at the Chamber of Commerce, then follows the lines of Suffolk-street, Nassau-street, and Clare-street, and passes through the gardens of the houses on the north side of Merrion-square and Lower Mount-street. On crossing the Grand

[a] The Prevalence and Distribution of Cholera in Dublin in 1866. By T. W. Grimshaw, M.D. Dublin Journal of Medical Science. 1878.

Canal at Lower Mount-street bridge, the line takes a sudden turn to the south, crosses Upper Baggot-street to the east of Waterloo-road, runs at the back of the houses in Waterloo-road, then crosses to the south-east through Clonskeagh, and ends at Williamstown. Besides these, there are other small alluvial gravel beds on the Tolka above Drumcondra, on the Liffey above Island-bridge, and on the Dodder above Milltown.

Taking the different registration districts of the city and suburbs, we find that—

I. In Clontarf there is only a small portion of the district on gravel, but nevertheless a considerable number of the inhabitants reside on this portion.

II. In Drumcondra a small portion only, but it also is populous.

III. In Glasnevin District there is a small portion of gravel composed of the Tolka alluvial deposit.

IV. No. 1 North City District—0·63 of the inhabited area is situated on the gravel bed.

V. No. 2 North City District—0·33 of the inhabited area is situated on the gravel bed.

VI. No. 3 North City—0·17 of the inhabited area is situated on gravel.

VII. No. 1 South City—Only a small portion along the river is situated on gravel.

VIII. No. 2 South City—0·45 of the inhabited area is on gravel.

IX. No. 3 South City—None of this district stands on gravel.

X. No. 4 South City—0·59 of the inhabited area is on gravel.

XI. Rathmines—Not any portion is on gravel.

XII. Donnybrook—Nearly all is on gravel.

XIII. Palmerstown has only a small portion on Liffey alluvial gravel bed.

If we investigate the relative prevalence of enteric fever in Dublin and its suburbs, as measured by the death-rate from the disease, we find the result shown in the accompanying table. This table unfortunately includes eight years only, as, previously to the year 1881, separate records of enteric, as distinguished from other fevers, were not kept.

DUBLIN REGISTRATION DISTRICT.

Deaths from Enteric Fever 1881–7 (*exclusive of deaths in Institutions of Persons admitted from without the Registration District.*)

Year	Suburbs								City	Total
	Clontarf	Coolock	Finglas	Palmerston	Rathmines	Donnybrook	Blackrock	Kingstown		
1881	–	6	–	1	6	12	1	7	87	120
1882	2	1	1	1	14	8	–	4	101	132
1883	3	3	1	1	10	4	5	11	93	131
1884	1	4	1	2	7	6	1	2	104	128
1885	4	2	–	8	7	11	1	2	107	142
1886	1	3	1	1	9	8	1	7	96	127
1887	3	6	1	2	12	5	2	5	95	131
Total .	14	25	5	16	65	54	11	38	683	911
Average—1881-7 .	2·0	3·6	0·7	2·3	9·3	7·7	1·6	5·4	97·5	130·1
Population	3,868	8,190	3,994	6,305	24,834	24,703	8,054	20,085	250,981	351,014
Rate per 10,000 living	5·2	4·4	1·8	3·6	3·7	3·1	2·0	2·7	3·9	3·7
	3·3								3·9	3·7

This table shows that the average annual death-rate per 10,000 inhabitants of the Dublin Registration District from enteric fever was during the past eight years 3·7, the lowest rate being 1·8 in Finglas, and the highest 5·2 in Clontarf.

Now, how has enteric fever been distributed in Dublin and its suburbs in relation to this gravel bed? Unfortunately we must here trust to a somewhat partial test—namely, the distribution of

the deaths during the past eight years, as prior to the year 1881 no record was kept of the separate forms of fever. The result for the period 1881–87 is as follows:—

The average death-rate from enteric fever in the Dublin District during the period under consideration being 3·7, we find of the districts with death-rates above the average—excluding for the present the consideration of the city districts—Clontarf, with a death-rate of 5·2, where the population lives almost entirely on the gravel; Coolock, with a death-rate of 4·4 per 1,000, with a small number of the population living on the gravel; Rathmines, at the average, without any population living on the littoral gravel, although men do live on alluvial beds along the rivers. The comparatively high death-rate from enteric fever in Rathmines, however, may easily be accounted for by the inferior and insufficient water-supply which existed there during the periods under consideration. Of the districts with enteric fever death-rates below the average, we have Palmerston district (Kilmainham) with a death-rate of 3·6, being a little below average, with a small amount of gravel and alluvium; Donnybrook, with a rate of 3·1, being nearly all situated on the gravel; Kingstown, with a rate of 2·7 only, and Blackrock 2·0 only, neither having any portion of their population living on the gravel; and, lastly, Finglas, without any stratum of gravel and a death-rate of but 1·8 per 10,000. We do not wish to attach undue importance to the rates in such small populations as those of Finglas and Clontarf, or even of Palmerston and Coolock. We will now deal with the city itself, to which these remarks more especially apply. During our inquiry as to the sanitary condition of the Royal Barracks, a map of the city was prepared by the Royal Engineers' Department in which were marked, by red dots, the localities of all the deaths from enteric fever which occurred from the 1st of January, 1882, to May, 1887. On this map was traced a line, also to be found on the map accompanying this paper, indicating the boundary of the gravel bed described by the Geological Survey as "Post-tertiary Fluvio-marine Sands, Gravel, and Clay." The marks of the localities of the deaths from enteric

fever were then counted, with the result shown in the following table:—

Deaths from Enteric Fever in the Area described as "Post-tertiary Fluvio-marine Sands, Gravel, and Clays."
(1882 to May, 1887).

—	Population Census, 1881	No. of Deaths from Enteric Fever—1882 to May, 1887		Rate to Population
		Net.	Per Cent.	
Post-tertiary Fluvio-marine Sands, Gravel, and Clays.	80,759	221	41	1 in 365
Remainder of City -	168,843	318	59	1 in 531
Total - -	249,602	539	100	1 in 463

The result here proves the greater fatality of enteric fever on those of the gravel beds, the deaths on the gravel beds being a the rate of 1 in 365 of the population, while off the gravel the rate was only 1 in 531, being as 1 to 1½; in other words, the chances of dying of enteric fever, to an inhabitant of the area situated in the gravel beds, were half as much more than if he lived elsewhere in the city.

A large number of cases have occurred in Commons-street and its neighbourhood. This locality is altogether on the gravel, lies low, and is very badly drained. Mecklenburgh-street and its neighbourhood shows very many cases of enteric fever. Until very lately the houses were badly drained, and many of them had privies close to the walls of the house; quite lately water-closets have been largely substituted for privies in these houses.

The district of Corn Market is one of the most congested in Dublin, and it is nearly altogether occupied by a poor class of persons, yet they seem to enjoy a comparative immunity from enteric fever. The ground lies high and slopes abruptly towards the river, which circumstance, together with the fact that the clay

prevails here, may account for its comparative immunity from enteric fever. The north-western portions of the city, lying upon the clay, are comparatively free from enteric fever. They occupy a comparatively elevated position, and their slopes favour drainage by gravitation.

It is remarkable that but few cases of enteric fever occur in the houses lining the quays. There is one group of cases on Wood-quay, but they have all occurred in tenement houses, without yards, and in which the sanitary accommodation was contained within the buildings. A case of enteric fever also occurred on Bachelors'-walk, but in a house unprovided with a yard. We have found that in many of the tenement houses in which enteric fever occurred, the water-closets were situated in the basement storey or other objectionable place. Very few occurred in the houses in which the water-closets were situated in the yards. The exhalations from the river, whatever injury they may cause to the public health, do not seem particularly to give rise to enteric fever amongst the inhabitants of the quays.

One reason why we might expect to find a greater prevalence of enteric fever in the gravel is the fact that it lies at a lower elevation than the clay, and in many places rises scarcely above high water in the river and its estuary. The gravels in Dublin are, in fact, water-logged for a large portion of the twenty-four hours. The mouths of all the main sewers that discharge their contents into the river are furnished with valvular tidal gates, which close automatically. When the tide rises to a certain height, the sewers which enter the river below the bridges are, on the average, closed for more than twelve hours daily. During this time all the sewage entering the sewers from houses and other places remains therein, except in the case of some of the easterly sewers which are connected with pumping stations. It is, however, not only the flow of sewage which is arrested for many hours daily—the sub-soil water in the gravel in the low-lying localities is prevented from flowing seawards, and the soil always is more or less water-logged. As the gravel everywhere interposes between the clay and the river, the whole of the drainage of the latter, except that portion which enters the sewers, passes into the gravel.

GLENGARRIFF AS A WINTER HEALTH-RESORT.

By D. EDGAR FLINN, F.R.C.S., M.K.Q.C.P.I.;

Examiner in Physiology, Royal College of Surgeons in Ireland, late Examiner in Hygiene; Surgeon to St. Michael's Hospital, Kingstown.

[Read in the Section of State Medicine, April 6, 1888.]

This charming health-resort, so naturally well situated on the shores of Bantry Bay, has of late years become much more easy of access than hitherto. Yet how many there are who seem to be unaware of its existence, and of the climatic advantages which it offers. Glengarriff is one of the bright sunny spots in this island, where nature has been most lavish in bestowing her choicest gifts. To speak of its scenic attractions is to divert attention from the point upon which it lays claim (and that a strong claim) to the notice of the health-seeker and the invalid.

Glengarriff supplies a want long felt in Ireland, where the sufferer recovering from a long tedious illness may find a climate mild, equable, and yet invigorating—a climate similar and in many respects preferable to that of Torquay, Bournemouth, or the Isle of Wight, a locality now more easily arrived at, and completely sheltered from the east, north, and north-west winds. The climatic conditions of Glengarriff have been considered in many respects similar to those of Pau in the south of France, with the difference that the air at the former is more bracing, and not so relaxing, as that experienced at the French health-resort. One incontestable and striking proof of the mildness of the climate is the abundant and forward character of its vegetation; tender fruit trees, which in other parts of Ireland are carefully nursed under cover during winter, here thrive without any protection. Grapes ripen in the open, and on every side are to be met the rarest and most delicate ferns and flowering shrubs of all kinds, rarely seen outside of a conservatory in these countries. The same may be said of table

produce; the potato (that favourite vegetable of the million in Ireland) planted early in February is ready for use in May. This fact alone, the luxuriant growth of the vegetable world at Glengarriff, is a very striking illustration of the exceptional mildness of the climate, and silently, though impressively and eloquently, conveys more than the most graphic description that could be given of this health-restoring and charming district. Goldsmith's lines—

> "Where smiling spring its earliest visit paid,
> And parting summer's lingering bloom delayed,"

may aptly be applied to Glengarriff.

Glengarriff is protected from the northerly and easterly winds by the Caha range of mountains, from the westerly winds by a spur of this same range, the "Sugar Loaf," the highest mountain, being about 1,900 feet above the level of the sea—in fact, the balmy south wind is the only one that has any power at Glengarriff, and that comes to it tempered by the benign influence of the Gulf Stream. The biting easterly winds that are experienced in the early spring at other health-resorts on the coast of Great Britain and Ireland are utterly unknown here, and the invalid in the months of February and March can with safety avail himself of the boon of outdoor exercise, the air being genial and warm. In the early spring of the present year (February), when the writer visited Glengarriff, the thermometer in the open at midday in the sun registered as high as 76°, and in the decline of the afternoon never went below 58°, and so mild was the climate in the evenings that persons were enabled to sit in the open air without feeling any discomfort or chilliness; we were experiencing May weather.

Leaving Dublin (Kingsbridge) at nine o'clock any morning, one can arrive at Glengarriff at seven o'clock, or a little after, in the evening. The drive from Bantry to Glengarriff is very picturesque and beautiful, the road skirting the borders of the Bay for nearly all the distance. During the winter and spring months, the hotels will send, on being apprised, most comfortable and well-appointed closed carriages, and during the summer season there is a regular service of coaches running thro n h from Bantr to Glengarriff,

Kenmare, and Killarney. Some years ago the journey to Glengarriff was looked upon as well-nigh an impossible task, but now it is most easy of access, and it seems very probable that within the next few years it will be placed in direct railway communication with all parts of Ireland. The hour and a half's drive, or thereabouts, from Bantry to Glengarriff, will be found by the invalid to be undoubtedly the most tedious part of the journey, but to such persons it would be advisable to rest in Cork one night, and go on to Bantry and Glengarriff next morning; the rest will be of service, and the drive on the following day along the sheltered shores of Bantry Bay will be most delightful and exhilarating.

Since Glengarriff has now become more easy of access, has such good hotel accommodation, and can offer unusual climatic advantages, it becomes a matter for earnest consideration whether we are justified in recommending patients (more especially those suffering from pulmonary affections) to places removed by long distances from their homesteads. It is doubtful whether the invalid is compensated for the loss of home associations and kindred comforts entailed by a long journey to the Continent. Here we have a district surrounded on all sides by high chains of mountains, and protected from all the cold and biting winds, open only to the balmy wind from the south, with an annual mean temperature of 52°, a winter mean temperature of 46°, an unusual amount of sunshine, a mild and equable climate, as evidenced by the luxurious character of the vegetable world, and hotel accommodation of the best class—in fine, a Madeira in Ireland. It is surely well worth our while to turn our earnest attention to the advantages so manifestly derivable from a health-resort so near home, and possessing so many natural advantages.

There can be no question of the suitability of Glengarriff as a residence for invalids in the winter and spring time of the year; its unusually mild and equable climate renders it a most desirable residence for sufferers from bronchial affections, consumptive and asthmatic patients specially deriving great benefit and relief from a sojourn there. Rheumatic and gouty patients requiring a high temperature and a minimum of variability of weather will derive

considerable relief during the winter months from a visit to Glengarriff. To the latter class of sufferers the climate offers very many advantages; to the consumptive invalid, the sun heat in the winter and spring time of the year, permitting on most days open-air exercise, is invaluable; in the majority of such cases the advent to Glengarriff is marked by an increased appetite, a disappearance of night perspiration and fever, and an improvement in the whole constitution; and I do not hesitate to say that in cases of consumption, or where there is a tendency to that disease, the climate and sheltered situation of Glengarriff have very marked and unrivalled advantages, surrounded as it is on the north, east, and west by lofty ranges of mountains, and thus protected from the harsh and biting east and north winds. The absence of foggy weather is also remarkable, and to the bronchial sufferer this is most important, as the baneful effects of fogs on pulmonary diseases are well known. It is a remarkable coincidence that comparatively few cases of phthisis and other affections of the chest and throat occur at Glengarriff and the surrounding districts.

Dr. Blennerhasset stated some years ago that in his dispensary practice he had only one consumptive case in 2,000, and out of 163,000 patients the number who laboured under phthisical disease was 85. He added that this malady was still rarer among the gentry, and that the progress of the disease was slower than was usual elsewhere. The late Dr. Alfred Hudson, of Dublin, Physician to the Queen in Ireland, bore testimony to the superior claims of Glengarriff as a winter and spring health-resort as follows:—"I first became acquainted with Glengarriff many years ago, when suffering from an obstinate laryngeal cough, which, however, rapidly yielded to the influences of its mild climate. Since then I have induced many invalids to resort to it, and with, I may say, decided advantage in every instance."

The late Dr. Hayden, Vice-President of the King and Queen's College of Physicians, Ireland, whose accurate information about disease and whose observant mind are well remembered, referring to Glengarriff, says:—"Few wants are more sensibly felt in Ireland than that of a suitable health-resort, to which, without submitting

to the pain and inconvenience of leaving their own country, those suffering from chronic or recurrent affections of the respiratory organs may have recourse during the winter and early spring months.

"A locality easy of access, sheltered from the east, the north, and north-west winds, presenting fine natural scenery under its most attractive form of mountain, wood, and water combined in due proportion, enjoying a warm, equable, pure and dry air, and affording, at a moderate expense, all the advantages of a comfortable home, with adequate provision for active exercise out of doors, free from the ordinary dangers of exposure, would supply the requisites of an establishment such as I contemplate.

"Glengarriff has been highly favoured by nature, and possesses, in a pre-eminent degree, the conditions essential to a site for a winter residence."

Dr. Gilbart Smith, Physician to the Royal Hospital for Diseases of the Chest, London, thus speaks of Glengarriff as a winter health-resort. As will be noticed, he refers personally to the benefits he himself received here:—"I know many who have gained considerable advantage there, but I can from personal experience bear my testimony, as some years ago, when in a state bordering on consumption, I derived very great benefit from a two months' happy sojourn at the Eccles Hotel.

"To that class of diseases of the chest which requires a winter residence in a warm and moist atmosphere, the climate of Glengarriff presents unrivalled qualifications."

Referring to the comparatively few number of cases of consumption at Glengarriff and the district surrounding it, it is worthy of note that in an interesting paper read by the Registrar-General for Ireland at the Royal Academy of Medicine in May, 1887, it was shown that there were two principal centres of excess of consumption on the eastern side of Ireland—namely, Belfast and Dublin—and the two principal centres of low prevalence on the western side were Mayo and Kerry; the rate of mortality from consumption in the Kenmare Union being as low as 9·2, and in the Bantry Union (in which Glengarriff is situated) only 11·8

per 10,000 of the mean population. It was furthermore noticed that where the rainfall was greatest the mortality from consumption was least, and that where the differences in temperature were greatest there it prevailed the most. The average annual death-rate from diseases of the respiratory organs during the years 1871 to 1880 in the Bantry Union was 23·8 per 10,000 of the population, and the death-rate from all causes during the year 1887 in the Glengarriff district was only 11·0 per 1,000—a low death-rate.

It is generally accepted that the climate of any particular district is mainly regulated by the influence of the wind, and is furthermore influenced by its height above sea level. If the locality is sheltered from cold winds by ranges of mountains or extensive woods, and at the same time is open to winds blowing from a warm point, and has a southern aspect, it possesses all the advantages and conditions of a winter health-resort. Glengarriff possesses these favourable conditions in an eminent degree.

In noticing the climate of Glengarriff, mention has been made of the forward character of the vegetation. Frequently the observations founded on the thermometer are open in many ways to error, and from a variety of circumstances may deceive the most careful observer. It is not so with the vegetable world. It cannot so easily deceive; temperature is simply a matter of life and death to plants, shrubs, flowers, &c., and they reveal much more than mere temperature, for they derive their very existence and luxuriance from moisture or dryness, from wind or calm, and from the character of the soil from which they take their growth. A continued and careful observation made for some years by a reliable local observer of the trees, flowers, shrubs, and fruit, and their forward growth in the early spring months of February and March, afford a strong and undeniable proof of the mildness and equability of the climate at Glengarriff.

It is much to be regretted that no regular and continued meteorological observations have been taken at Glengarriff. The nearest meteorological station is Valencia, which is about thirty miles distant and to the north-west. The mean annual temperature at Valencia for the years 1885, 1886, and 1887, was 51·1°;

and from a series of observations made some three years ago the mean annual temperature at Glengarriff was 52·0°, which is higher than the mean annual temperature of Torquay—51·1°; Ventnor, 51·9°; and Bournemouth, 51·2°. The average annual rainfall is between 40 and 45 inches.

The harbour at Glengarriff is probably one of the most picturesque sheets of water to be met with in the South of Ireland. It is studded over with an innumerable number of verdure-clad islets, each one presenting peculiar beauties of its own. Chief amongst the number is the island of Garinish, surmounted by a fort and martello tower. Possibly the finest view of the bay and harbour is that from a hill on the Bantry side of Roche's Royal Hotel, from the summit of which a splendid view is obtained of the numerous islets, some thirty in number, the Eccles Hotel, Glengarriff Church, a large portion of Bantry Bay, the fine range of hills lying between Bantry Bay and Dunmanus Bay, including Mount Gabriel, the whole range of the Caha mountains, &c. Another equally fine view is that from the pleasure-grounds in the rere of the Eccles Hotel. This affords a somewhat different aspect, as picturesque as the preceding. Within the grounds of Roche's Hotel are some charming walks, sheltered and leading down to the water's edge, presenting here and there the most fanciful and picturesque views. There are prettily-situated waterfalls in the midst of a dense wood, the upper one, the smaller of the two, being crossed by a rustic bridge, which adds considerably to the beauty of the scene.

Glengarriff has two hotels, both exceedingly well managed and very comfortable. It is no exaggeration to say that it would be difficult to find their equal in the kingdom. They are both most beautifully situated, and possess every modern convenience that the most fastidious traveller can desire. During the early spring months the Eccles Hotel, being situated in the valley and surrounded on all sides by hills, is perhaps the most suitable for the invalid; its sheltered position is more particularly an advantage to the bronchial sufferer at this season of the year.

Roche's Royal Hotel, charmingly situated within its own grounds

and standing on an eminence, has the advantage as a residence at the other seasons of the year; its elevated though well-protected position renders it more bracing and invigorating, and not so relaxing; besides, it commands some of the finest views of the scenery around Glengarriff. At both hotels boarders are taken at a moderate tariff during the winter and spring months.

The absence of a resident medical man was up to the present time rather a hindrance to the recommendation of invalids to Glengarriff, but the guardians of the Bantry Union are now erecting a house for a doctor in the most central situation, so that in the future medical assistance will be near at hand.

There is a very good service of trains between Cork and Bantry, but the need of a direct communication at Cork between the two railway termini is very apparent. If this connection were made, it would be of very great advantage, and a decided boon to the travelling public.

Dr. Adderley, the local medical officer, informs me that the mortality from diseases of the chest is very small, and that cases of phthisis are very rare. Twenty-four of the thirty-two deaths registered during the year 1887 averaged seventy-nine years, and diseases of an epidemic character were altogether absent.

Glengarriff possesses in a superlative degree all the conditions essential to a health-resort of the first order, and, as a winter and spring residence, it has very few equals (if any) in these countries. Well might Thackeray exclaim—"What sends picturesque tourists to the Rhine and Saxon Switzerland, when at Glengarriff there is a country the magnificence of which no pen can give an idea? Were such a bay lying upon English shores, it would be a world's wonder."

SECTION OF ANATOMY AND PHYSIOLOGY.

NOTES OF SOME NERVE ANOMALIES.

By AMBROSE BIRMINGHAM, M.B.;
Professor of Anatomy, Catholic University, Ireland.

[Read before the Section of Anatomy and Physiology, January 6, 1888.]

I BRING the following notes of cases of nervous anomalies before the Section of Anatomy and Physiology, in the hope that they may be of some interest, either from their rarity or from their peculiarities:—

CASE I.—The first case is a spinal accessory nerve ending in the sterno-mastoid without giving any branches to the trapezius. The nerve was smaller than usual. This fact at first attracted my attention. On careful dissection, I found that it broke up in the muscle without sending, as far as I could make out, a single filament to the trapezius, which was supplied by branches from the third and fourth cervical nerves. Dr. Curnow, in the *Journal of Anatomy and Physiology* for 1873, describes a condition similar to the above; and, further, in the same paper, he relates a case in which the spinal accessory nerve divided into two parts—one pierced the sterno-mastoid and ended in it, the other passed backwards, superficial to the muscle, joined a branch of second cervical, and, with another branch coming from the fourth cervical, supplied the trapezius. I also have found two subjects in which there was an almost similar condition of the spinal accessory; but in my cases the branch of the nerve to the trapezius passed backwards under cover of, instead of superficial to, the sterno-mastoid. From his two cases, Dr. Curnow infers that the trapezius is supplied solely by the cervical fibres of the spinal accessory—a very probable conclusion. Unfortunately he makes no mention of an examination of the cervical portion of the spinal cord, with the condition of the origin of the spinal accessory from it. Such an examination would be of the highest interest in these cases. I, too, unfortunately, had not an opportunity of making an examination of the cord.

I can find no other record of a similar condition of the spinal accessory nerve.

CASE II.—Another abnormality which may be worthy of record is one in which the place of the buccal branch of the fifth nerve was taken by a large nerve springing from the orbital branch of the superior maxillary division of fifth, which pierced the outer wall of the orbit, ran down on the tuberosity of the superior maxilla, and broke up on the buccinator into many twigs, which were distributed in the same way as a normal long buccal nerve. At first sight I thought this nerve came from the anterior temporal branch of the inferior maxillary in the temporal fossa, a condition of things which is described by Cruveilhier; but on careful dissection it proved to be a nerve having the origin and running the course detailed above. Remembering the fact that the long buccal is sometimes replaced by a branch of the superior maxillary, notably by part of the posterior superior dental, I considered that the nerve which I have described corresponded to such a branch arising further back than usual. Professor Sir William Turner saw the buccal arise from the inferior dental in the canal. It has also been seen (Gaillet) arising directly from the Gasserian ganglion.

CASE III.—This was a large nerve distributed to the skin of the upper half of the inner aspect of the thigh. It arose by two roots, one from the back of the sacral plexus deriving its fibres from the second sacral nerve; the other also from the back of the plexus, a little lower down, corresponding to the third sacral. In size it was larger than the normal long pudendal; it pierced the great sacro-sciatic ligament, ran downwards over the tuberosity of the ischium, crossing the long pudendal and communicating with it; lower down it broke up into numerous branches which were distributed to the skin on the inner aspect of the upper half of the thigh over a region usually supplied by the small sciatic, and perhaps by branches of the internal cutaneous of anterior crural. All the other nerves of the region were normal. I consider the branch described part of the small sciatic which was disassociated from the rest of the nerve: it derived its fibres from the same sacral nerves as the small sciatic.

CASE IV.—*Nerve supply of an axillary muscular arch* (Achselbogen).—Last year, while dissecting an axilla, I found a particularly well-developed axillary arch, and as might be expected (from the

unusual development of the arch), I found a particularly large nerve supplying it; indeed, the nerve was out of proportion to the size of the arch. On following up the nerve it was found to come direct from the inner cord of the brachial plexus, between the nerve of Wrisberg and the internal anterior thoracic.[a]

CASE V.—*Abnormal small occipital nerve.*—The small occipital is sometimes divided into two parts which run the course of the undivided nerve. This winter I found a small occipital divided in this fashion. One branch followed the course of the normal nerve along the back of the sterno-mastoid; the other passed obliquely across the occipital triangle, got under the trapezius, pierced it about three-quarters of an inch from its anterior border and two inches from its insertion, and then, without giving any branches to the muscle, the surrounding structures, or forming any connections, it again crossed the occipital triangle obliquely, joined the back of the sterno-mastoid, and ran to its distribution with the other branch. Why the nerve ran this peculiar course it is hard to say. It gave off no branches in the reflected part of its course, and it seemed to be, when dissected, simply a nervous cord passing through a pulley in the trapezius. A somewhat similar condition has been described, but the trapezius was pierced near its insertion, and the nerve was not reflected forwards to the sterno-mastoid.

CASE VI.—*Abnormal nerve of Wrisberg.*—Three times I have found, after careful dissection, the nerve of Wrisberg absent as a branch of the brachial plexus, and its place taken by a nerve which was apparently the lateral cutaneous of the first intercostal nerve. On following this nerve backwards it was found to come from the anterior primary division of the first dorsal, coming off close to the intervertebral foramen, between the first intercostal and the branch of the first dorsal which goes to the brachial plexus. From its origin it ran outwards immediately under the pleura covering the first intercostal space, and pierced the muscles opposite the middle of the axilla. In its further distribution it corresponded to a normal nerve of Wrisberg.

[a] Since I read this paper I have shown, in a paper on the Homology of the Achselbogen, &c., read before the Academy in March, 1888, that the axillary muscular arches are normally supplied by a branch of the internal anterior thoracic nerve.

ON THE DISTRIBUTION OF THE CUTANEOUS NERVES ON THE DORSUM OF THE HUMAN HAND.

By H. St. JOHN BROOKS, M.D.;
Chief Demonstrator of Anatomy in the University of Dublin.

[Read in the Section of Anatomy and Physiology, January 6, 1888.]

In the commencement of the present Session (1887–88), I was led to investigate the anatomy of the cutaneous nerves on the dorsum of the hand by some passages I had met with in Létiévant's "Treatise on Sections of Nerves." In his preface, this author states that after section of a nerve-trunk, sensation is never completely lost in the area of distribution of the divided nerve—a certain amount of sensibility always persists. Létiévant explains this by the part played by "anastomoses" and by "ébranlement des papilles à distance."[a] Communications between nerves or "anastomoses" afford a very inadequate explanation of many of the phenomena which this great neurotomist describes in his book; and although the supposition, that distant nerve-endings can be affected by shock transmitted through the skin, may throw some light on the persistence of sensibility in the area of distribution of a divided nerve, it entirely fails to explain the fact that the partial loss of sensation sometimes extends beyond the limits which should be reached by the ultimate twigs of the nerve which has been cut, if the accounts given in anatomical text books are correct. A striking example

[a] Traité des Sections Nerveuses. Paris, 1878. "Malgré la section d'un nerf il reste toujours, dans sa région, de la sensibilité, quand la division a porté sur un nerf sensitif; . . ."—Preface, p. xiv. "On ne saurait nier, certes, le rôle des anastomoses; il convient même d'insister sur leur importance. Mais, chez l'homme, il y a, de plus, une perception des sensations tactiles par ébranlement des papilles à distance."—Ibid, p. xvi.

of this is shown in Fig. 6,[a] where the fourth and fifth fingers are seen to be considerably affected by section of the musculo-spiral nerve.

Having incidentally observed, in the course of my usual work in the dissecting-room, that the twigs of the radial and ulnar nerves occasionally crossed one another, or overlapped in their distribution, on the dorsum of the hand, it occurred to me that the phenomena observed after section of nerves might be explained by something more than mere anastomoses, that it was possible that a given area of skin might be very commonly supplied by twigs from two different nerves. I was at that time unaware that R. Jacobi[b] had already advocated a similar theory in regard to the "collateral innervation of the skin." As I believed that by means of special dissection it would be possible to trace the nerves nearly to their terminations, I proceeded as follows:—After securing the trunks of the palmar digital branches of the median and ulnar nerves, and also the radial, the dorsal branch of the ulnar and the external cutaneous branch of the musculo-spiral, I proceeded to remove the skin, superficial and deep fascia, with the nerves included, from the back of the hand and from the fingers. A longitudinal incision was made along the centre of each finger on its volar aspect, the skin reflected towards the dorsum, and the nails, with as much of their matrix as possible, were also retained in connection with the skin. The skin was then pinned down, with the deep surface upwards, in a cork-lined tray, and the nerves followed out under water. The first hand that I examined in this way was somewhat disappointing, inasmuch as the amount of crossing of the nerves was inconspicuous. The second example, however, showed considerable intercrossing of the radial and ulnar nerves, and I therefore determined to make every effort to ascertain the ultimate distribution of their twigs. The dissection occupied about twenty-six hours, and the result is shown in Fig. 1. As the nerves were

[a] Op. cit.. p. 105. This figure has been reproduced in the accompanying plate. See Fig. 5.

[b] "Ein merkwürdiges Sensibilitätsphänomen." Von Dr. Rud. Jacobi. Berliner klin. Wochenschrift, 6 und 20 Juni, 1887.

dissected in connection with the skin, it has been thought better to represent them in the drawing in this way rather than to show them in relation to the fascia and tendons, as is the more usual practice. In determining the exact positions of the various branches, the following three points were observed:—1. The folds corresponding to the metacarpo-phalangeal and inter-phalangeal articulations. 2. The clefts between the fingers. 3. The usual position of the larger branches as determined from hands dissected in the ordinary way. To insure accuracy, pins were thrust through the centre of each of the skin-folds. The nerves were at first drawn as they appeared in the dissection, and afterwards reversed and transferred on to a drawing made from the hand of another subject, which was selected for the purpose on account of its similarity to the one in which the nerves were dissected. The following points will be observed:—1. The dorsal branches of the ulnar and radial nerves intercross for the space of three fingers; the basal parts of the index, middle and ring fingers, and a considerable part of the skin of the dorsum of the hand are thus shown to have a double nerve-supply. 2. The smaller twigs always cross on a plane superficial to the larger branches. 3. The communications or anastomoses are inconsiderable (in this case), while the nerves freely cross one another. 4. Speaking generally, the radial nerve retreats for the space of one joint as it advances from the radial to the ulnar side, and the ulnar behaves in a similar manner in its course from the ulnar to the radial side; thus the radial nerve reaches the ungual phalanx of the thumb, the distal inter-phalangeal joint of the index finger, the proximal inter-phalangeal articulation of the middle, and the metacarpo-phalangeal joint of the ring finger. The dorsal branch of the ulnar supplies the skin about the nail of the little finger, and gradually becomes more and more proximal in its distribution until it reaches the index finger.

The advantages of the method employed are obvious. As the ends of the nerves are fixed in the skin, they are maintained in position, and also the fine twigs are preserved which would inevitably be removed in skinning the subject in the ordinary way. This mode of tracing cutaneous nerves has been often employed,

and it appears to have been a favourite method with Henle.[a] I am not aware, however, if the nerves of the dorsum manûs have been previously treated in this way *under water*. When the preparation is placed under water and traction is made on the trunks of the radial and ulnar nerves alternately, the general distribution of each nerve and many of the finer branches can be seen without further dissection; this applies more particularly to the back of the hand; in the fingers, on account of the tough and opaque nature of the fascia, the results are not so good.

I have examined the nerves by the above method in six hands, and have also succeeded in seeing the crossing of the nerves in four other hands, which I dissected in the ordinary way. In another of the six cases dissected under water I found the radial and ulnar nerves crossing in their distribution to the extent of three fingers (index, middle, and ring); in the others, the area of skin thus doubly supplied was much smaller; in one case being not more than a quarter of an inch in breadth. While regarding the amount of crossing of the two nerves which is displayed in Fig. 1, as unusually large, I am inclined to think that the amount of skin on the back of the fingers, which is supplied by the dorsal digital nerves, is fairly typical. In five of the ten cases, the dorsal branches of the ulnar nerve were traced to the nail of the little finger, and, from the size of the nerves, they probably extended equally far in the other five cases also. In the thumb, as is well known, the branches of the radial regularly extend as far as the nail. In the index and ring fingers, I found that the dorsal nerves usually reached the second inter-phalangeal joint. In the middle finger the dorsal nerves generally extend only as far as the first inter-phalangeal articulation; but in one case I found a branch of the ulnar nerve, and in another subject, a combined branch of the ulnar and radial nerves, reaching as far as the ungual phalanx of this digit.

In Fig. 2[b] of Létiévant's book, the dorsum of the ungual phalanx of the thumb is shown to be profoundly affected by section of the median nerve. This led me to pay particular attention to the

[a] Handbuch der Nervenlehre. 1879. Fig. 285, 286, 291 u. 292.

[b] This figure is reproduced in the accompanying plate. See Fig. 6.

distribution of the palmar digital branches of the median to the thumb. In the hand from which Fig. 1 was taken I could not follow any of the twigs on to the dorsal surface; but in most of the other cases I found twigs which would amply account for the loss of sensation depicted in Létiévant's figure. In three cases I traced particularly strong branches under the thumb nail, and found them ramifying in the bed of the nail. This arrangement is shown in Fig. 2. The twigs from the median passed in these cases under cover of a ligamentous band, and wound round the ungual phalanx, keeping close to the bone, to reach the dorsal surface.

In Fig. 1 a twig from the external cutaneous branch of the musculo-spiral is shown crossing the branches of the ulnar nerve; in two of the other five cases dissected under water this nerve communicated with branches of the radial just below the wrist-joint. In two others its distribution was much more extensive. In one case it reached the metacarpo-phalangeal articulation of the little finger, and communicated, in this situation, with one of the branches of the ulnar nerve. In the other example it was as large as one of the ordinary dorsal digital branches of the ulnar nerve, and it supplied the skin on the dorsal surface of the base of the proximal phalanx of the ring finger and extended on the little finger as far as the base of the middle phalanx of that digit. In Létiévant's case of section of the musculo-spiral nerve (above referred to) the little finger may therefore have received a partial supply from the external cutaneous branch of the musculo-spiral.

A twig of the musculo-cutaneous nerve was in one case found crossing the branches of the radial on the back of the hand. It is well known that the musculo-cutaneous nerve communicates with the radial on the back of the wrist; in one subject I found large branches joining the branch of the radial which supplies the radial side of the thumb, and another considerable branch joining the division of the radial which bifurcates to supply the adjacent sides of the thumb and index finger. These communications from the musculo-cutaneous were proportionally of sufficient size to have taken a considerable part in the sensory supply of the dorsum of the thumb, and possibly of the index finger also. Dr. David Hepburn

has recorded a case in which the musculo-cutaneous nerve constituted the sole supply of the radial border of the thumb, and shared with the ulnar in the supply of the ulnar border of that digit, the radial nerve being absent.[a]

I have never succeeded in following the internal cutaneous as far as the back of the wrist; it stops immediately above the lower end of the ulna.

It appears from the above facts that certain areas of the skin on the back of the hand may be supplied by no less than three nerves—viz., part of the ring finger by the radial, ulnar, and median nerves; a small area below the ulnar side of the wrist by the radial, ulnar and musculo-spiral nerves, and, more rarely, a very limited area, situated more towards the radial side, by the radial, ulnar and musculo-cutaneous nerves. It also appears that the amount of intercrossing varies very greatly in different hands.

I have not been able to find any description of a double innervation of the skin of the hand in the literature of the subject. Most anatomists do not even hint at such a thing. Henle,[b] however, figures a twig of the ulnar crossing the radial for a very short distance, but he does not describe it in the text. Ranney,[c] referring to a figure representing the areas of distribution of the median, ulnar, and radial nerves on the back of the hand, says:—"This diagram limits the distribution of each nerve with more positiveness than can well be verified, since the cutaneous filaments of two nerves may supply the *borders* of any of these regions, as the nerves tend to overlap each other."

With regard to the cutaneous supply of the fingers, some text-books have represented the dorsal digital nerves extending uniformly as far as the ungual phalanges of the fingers; these statements do not require to be seriously criticised. In "Quain's Anatomy" and in the German text-books the dorsal nerves are represented as extending to the nail only in the case of the thumb; the dorsal branches

[a] Journ. of Anat. and Phys. Vol. XXI., p. 511.

[b] Op. cit. Fig. 291., p. 545.

[c] Applied Anatomy of the Nervous System. By A. L. Ranney. London. 1881. P. 411.

to the four inner digits are described as reaching no further than the first inter-phalangeal joint, the palmar digital nerves curving round beyond that point to supply the fingers on their dorsal aspect. Henle[a] has stated very positively that in the case of the thumb the palmar (median) twigs do not reach the dorsum, the same is asserted by Hilton,[b] and also by Krause.[c]

Through the kindness of Mr. Wheeler, Surgeon to the City of Dublin Hospital, and of Mr. Corley, President of the Royal College of Surgeons, Ireland, I have had the opportunity of examining two cases of nerve section in the living subject. Case I. was a woman of about fifty years of age, in whom the ulnar nerve had been divided above the elbow in May, 1887. I made a careful examination of the affected hand with the aesthesiometer, and I have shown the result in Fig. 3. Over the ulnar margin of the hand, the little finger, and half of the ring finger, the sensation appeared to be completely lost; sensation was also greatly impaired over a considerable part of the dorsum of the hand and over the radial side of the proximal phalanx of the ring finger; this is indicated by the blue shading in the figure. A narrow band (indicated by red shading) on the radial side of the area just described, showed slightly affected sensation. This case differs greatly from the case described by Létiévant,[d] in which the loss of sensation was confined to the little and ring fingers, and the transition from affected to sound parts was abrupt. It differs also inasmuch as sensation appeared to be completely lost on the ulnar side of the hand, while in Létiévant's case a certain amount of sensibility was preserved.

[a] Op. cit., p. 550. "Der Daumen ist der einzige Finger, an welchem die dorsalen Nerven sich bis unter den Nagel erstrecken; an den übrigen Fingern enden sie an der Mittelphalange und wird die Endphalange von Zweigen der volaren Nerven auch an der Rückseite versorgt. Mit Rücksicht auf den nervenreichsten und empfindlichsten Teil der Finger, das Nagelglied, gehören also die Dorsalflächen der drei medialen Fingerränder dem N. ulnaris, der fünf nächsten dem N. medianus, der zwei radialen oder Daumenränder dem N. radialis an."

[b] "Rest and Pain." Fourth Edition. 1887, pp. 196, 197.

[c] Handbuch der menschlichen Anatomie. Hannover. 1879. Zweiter Band. S. 897.

[d] Op. cit. Fig. 4., p. 34.

That sensation may be completely lost in such cases is shown by a case lately published by Dr. Jencken,[a] in which, after traumatic section of the ulnar nerve, sensation was so completely lost in the little finger that the man would often allow it "to remain in contact with the flame of a lamp or gas jet until the skin was burnt, for the amusement of his comrades."

The difference between Létiévant's case and the one which I examined appears to indicate that in the one patient the crossing of the radial and ulnar nerves was very slight, and that in the other it was considerable.

Case II. was a man of about forty years of age, in whom the ulnar and median nerves had been divided just above the wrist by an accident which occurred in February, 1875. Sensation was impaired, but nowhere completely lost. The loss of sensibility was more marked on the palmar than on the dorsal surface of the fingers, the maximum anaesthesia being on the palmar surfaces of the little finger and ulnar half of the ring finger. An inspection of the diagram (Fig. 4) suggests the probability that either the radial nerve or the external cutaneous branch of the musculo-spiral crossed as far as the little finger in this case, and that the amount of distribution of the ulnar nerve on the back of the hand was small.

It appears from the above facts that the sensory effects of section of a nerve, *e.g.*, the ulnar, may vary considerably. (*a*) The amount of skin affected is much greater in some patients than in others (compare the above case—Case I.—with Létiévant's). (*b*) The degree of loss of sensibility is subject to considerable differences (compare Dr. Jencken's case, in which sensibility was entirely lost, with Létiévant's cases, in which a certain amount of sensation always persisted). These differences in the clinical facts find a ready explanation in the greater or lesser degree of intercrossing of the nerves which has been already described.

That great differences exist in the distribution of the grosser branches of the radial and ulnar nerves on the dorsum manûs, has

[a] "Suture of Divided Ulnar Nerve after Six Months." British Medical Journal, 10 Dec. 1887, p. 1274.

long been known; Henle[a] represents the normal arrangement as follows:—"The little and ring finger and the ulnar half of the middle finger, as supplied by the ulnar and the other two and a half digits by the radial; Krause's[b] account is substantially the same, but he is inclined to give the radial nerve a larger share in the innervation of the middle finger; he notices that in rare cases this nerve may supply the fourth or even the fifth finger.[c] Quain states that the radial nerve supplies the dorsum of the thumb, the index and the radial border of the middle finger; the ulnar nerve on the other hand is distributed to the little finger and to the ulnar border of the ring finger; while the adjacent sides of the middle and ring fingers receive their nerve-supply from combined twigs of the radial and ulnar nerves.[d]

I have already referred to the able paper by Dr. R. Jacobi which appeared in the *Berliner klinische Wochenschrift* last year. This observer suffered, in his own person, the accident of section of the median and the musculo-spiral nerves. His observations led him to the conclusion that a "collateral" (double or multiple) innervation of the skin existed which would account for the clinica phenomena. I regret that I have not had the opportunity of consulting his larger work on the "Collateral Innervation of the Skin,"[e] but, from what I can gather from the paper I have read, he appears not to have made any anatomical researches with a view of demonstrating the collateral innervation of the skin. He mentions, however, the following interesting observation:—That if one of the four nerves which supply any of the toes is cut, and

[a] Op. cit., p. 550.

[b] Op. cit., p. 896.

[c] Op. cit. Dritter Band, p. 209. "N. radialis superficialis. Liefert selten auch Nn. digitales dorsales für den vierten Finger, oder (sehr selten) zugleich für den fünften Finger, während der N. ulnaris dorsalis fehlt." In Dr. Hepburn's paper (above referred to) a case is recorded in which the dorsal branch of the ulnar nerve was absent. "Here the radial nerve supplied the cutaneous branches for the entire dorsum of the hand and fingers." He also describes a case in which the radial nerve was wanting, the dorsum of the hand being supplied by the ulnar and musculo-cutaneous nerves.

[d] Quain's Anatomy. Ninth Edition. 1882. Vol. I, pp. 610 and 616.

[e] Archiv für Psychiatrie u. Nervenkrankh. Bd. XV. S. 151-183 u. 506-559.

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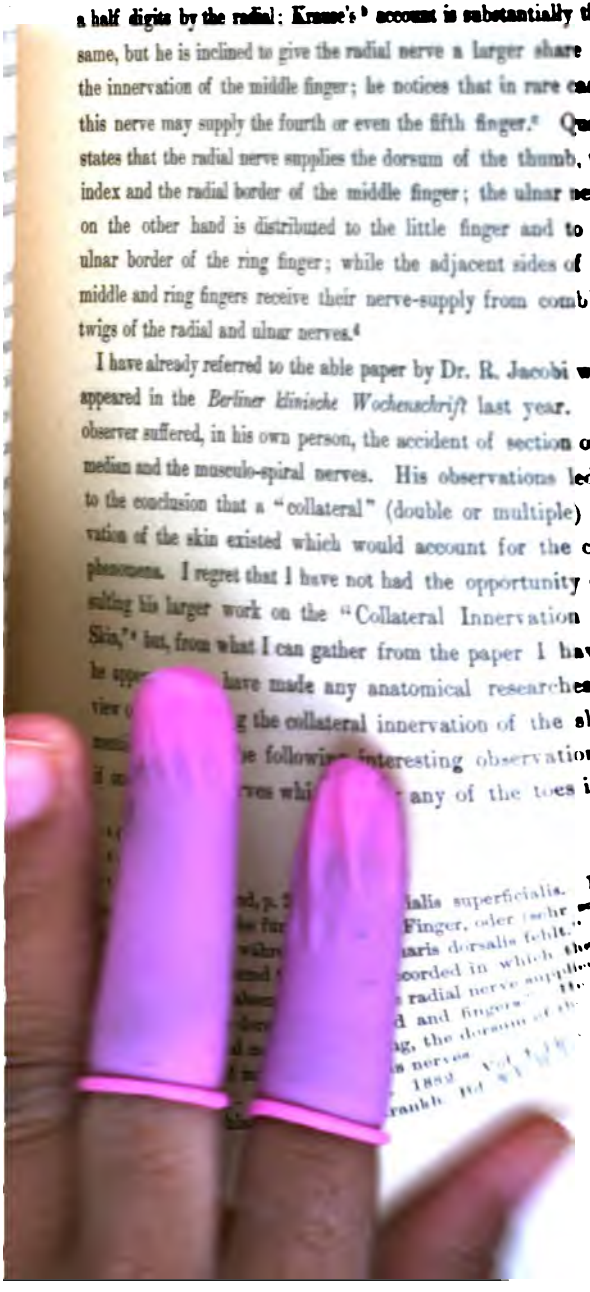


a portion of the peripheral stump subjected to microscopical examination some weeks after the section, a certain number of perfectly intact fibres will be found lying among the degenerated fibres. This gives evidence, not of a true double innervation of the skin, but offers an example of "nerves without ends" as described by Hyrtl. Such communications are well known to occur abundantly on the dorsum of the hand and fingers, and are of the nature of the "anastomoses," on which Létiévant throws so much weight in the explanation of the clinical phenomena.

EXPLANATION OF PLATE.

Fig. 1.—Shows a dissection of the cutaneous nerves on the dorsum of a hand. The radial nerve is shown in blue, the ulnar in red, the median and the external cutaneous branch of the musculo-spiral, *msp*, in black. *r*, Radial nerve. *u*, Dorsal branch of the ulnar nerve. *m*, Branch of the median nerve. Observe that the twigs of the radial and ulnar nerves cross one another for the breadth of three fingers.

Fig. 2.—Thumb taken from another subject, showing twigs from the median nerve ramifying under the thumb nail.

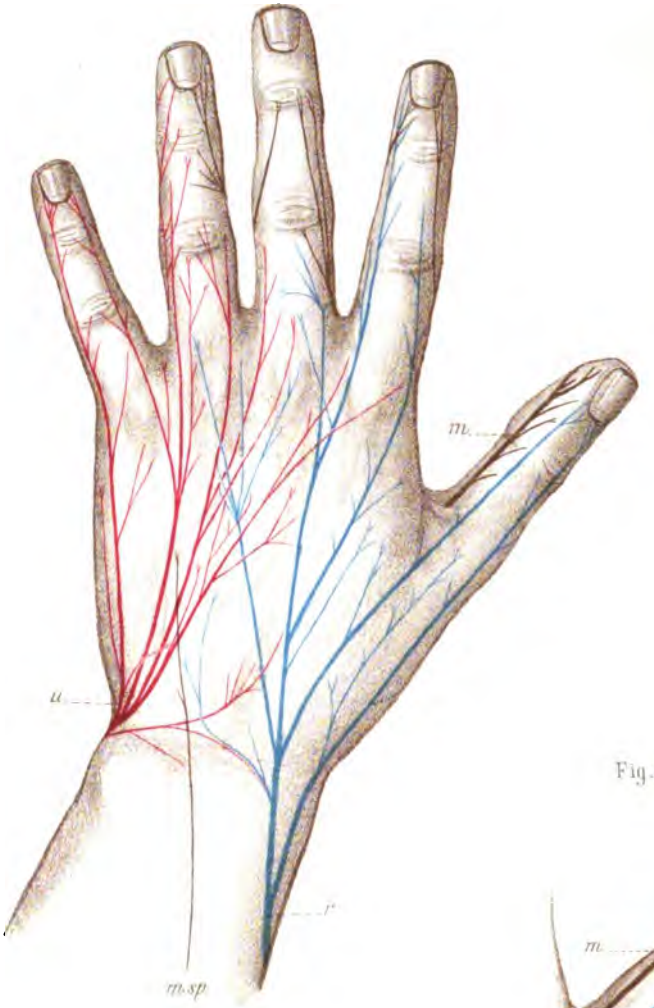
Fig. 3.—Diagram of the case of section of the ulnar nerve, described in Case I. (In this and in the succeeding figures the dark shading indicates the parts most profoundly affected, the blue those in which the sensibility is less impaired, and the red shows the area in which but slight loss of sensation occurs.)

Fig. 4.—Diagram of the case of section of the median and ulnar nerves, described in Case II.

Fig. 5.—Section of musculo-spiral nerve (after Létiévant.)

Fig. 6.—Section of median nerve (after Létiévant).

Fig. 1.



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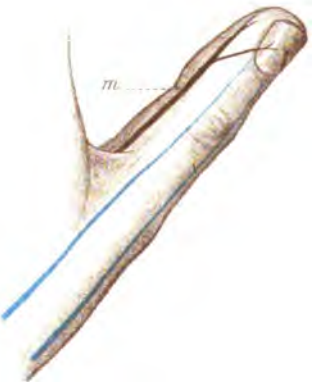

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Lith. Anst. v. E. A. Funke, Leipzig.

ON THE HOMOLOGY AND INNERVATION OF THE ACHSELBOGEN AND PECTORALIS QUARTUS, AND THE NATURE OF THE LATERAL CUTANEOUS NERVE OF THE THORAX. (*Abstract.*)

By AMBROSE BIRMINGHAM, M.B.;
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[Read before the Section of Anatomy and Physiology, March 2, 1888.]

The Achselbogen—which is found once in every sixteen subjects, according to Professor MacAlister—is a narrow band, generally muscular, passing from the posterior to the anterior fold of the axilla. The pectoralis quartus is a rare muscle in man, commonly found in animals. It runs along, or under cover of, the lower margin of the pectoralis major, from the thorax to the upper part of the arm. Various views are held as to the homology of each of these muscles. We shall test each view by the following criteria of homology, position, origin, insertion, and, most important, nerve supply. First, the pectoralis quartus was considered by Mr. Galton to correspond to the Achselbogen. That this is not so is proven at once, I think, by the fact that in two cases—the notes of which Dr. Brook has kindly sent me—the pectoralis quartus and Achselbogen were both present, each occupying its usual position.

Mr. Woods was of opinion that the pectoralis quartus was an imperfectly developed slip of the dorso-epitrochlearis; but in many animals the two muscles are present together, and they disagree in origin, position, insertion, and nerve-supply. The pectoralis quartus is supplied by the internal anterior thoracic, the dorso-epitrochlearis by the musculo-spiral nerve.

The remaining views are those of Professor Owen and Professor Humphry. According to the former, the pectoralis quartus is a differentiated portion of the lower border of the pectoralis major,

scapular nerve which supplies the latissimus, and these considerations led me first to give up Professor Humphry's view and take up, as more probable, the theory of Professor Turner. Here we may seek the true nerve-supply of the Achselbogen. Out of nine cases (some of which I have dissected myself, others I have got notes of from several friends), in five the nerve came direct from the internal thoracic, in one from the loop between the two thoracics, in one from the inner cord close to the origin of the internal thoracic, and in one from the nerve of Wrisberg, which arose by a trunk common to it and the internal thoracic. These three latter cases can scarcely be said to differ fundamentally from the first five. In one case the nerve was recorded as coming from the intercosto-humeral. From these cases it is evident that the nerve supply of the Achselbogen comes from the internal anterior thoracic.

And now for Professor Owen's view. The chief difficulties to be got over before we adopt it are the facts that the panniculus passes, as a rule, freely over the latissimus, whereas the Achselbogen is closely united to it, and that the Achselbogen is supplied by the internal anterior thoracic, while the panniculus is supplied by a nerve called in animals "the lateral cutaneous nerve of the thorax," a nerve which is generally considered to be the homologue of the nerve of Wrisberg. To get rid of the first objection, if the panniculus be examined in a series of animals, it may be found, first, freely passing over the margin of the latissimus (rabbit, horse, macaque), next it becomes adherent to the border of the latissimus (cat), then there is a blending of the two muscles and an apparent interchange of fibres (cynocephalus anubis), and there is even a more complete blending in some animals (phalangina, vulpina, and wombat). Several other points in connection with various conditions of the Achselbogen—as, for instance, a case where part of the humeral panniculus was developed on the side of the thorax and this blended above with the Achselbogen—all lead to the conclusion that it is quite possible for part of the panniculus to bear to the latissimus dorsi the relation which the Achselbogen bears to it.

The last difficulty in the way of Professor Turner's view is

the apparent difference in nerve-supply—the apparent difference between the internal thoracic and the lateral cutaneous of thorax, which is considered the homologue of the nerve of Wrisberg. The solution of the difficulty lies in the discovery of the true nature of the lateral cutaneous nerve. In the oppossum, kangaroo, and wallaby, the internal thoracic is absent; the lateral cutaneous takes its place and receives the branch of communication from the external thoracic. Here, evidently, the lateral cutaneous is something more than the nerve of Wrisberg. In the dog the nerve is formed by two roots—one from the internal thoracic, the other from the inner cord of the plexus. In the cat a somewhat similar arrangement exists. In the rabbit the internal thoracic and lateral cutaneous arise by a common trunk. In the macaque I have a few times found what appears to be a transitional form between those just described and the condition in man. In this animal a branch from the internal thoracic joined a branch from the intercosto-humeral, and the result of the union was a nerve which ran down the arm (and was apparently the nerve of Wrisberg), and a nerve to the panniculus. A consideration of these cases would point to the conclusion that the lateral cutaneous nerve of the thorax contains within itself not only the representative of the nerve of Wrisberg, but also some fibres of the internal thoracic for the supply of the panniculus; so we conclude that the panniculus is supplied, like Achselbogen, by the internal anterior thoracic, and (the last difficulty in the way of Sir William Turner's view being removed) that the Achselbogen corresponds to part of the humeral panniculus.

The points sought to be proved in the foregoing are—1st, that pectoralis quartus corresponds to part of pectoralis major; 2nd, that its nerve-supply is the internal thoracic; 3rd, that Achselbogen is panniculus; 4th, that it is also supplied by the internal thoracic; and, lastly, that the lateral cutaneous nerve of the thorax is not the homologue of the nerve of Wrisberg alone, but that it contains within it some of the internal thoracic for the panniculus.

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